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OFFICIAL REPORT

CALIFORNIA

State Agricultural Society's
FOURTH ANNUAL FAIR,



Cattle Show and Industrial Exhibition.

Held at Sacramento, September 22nd to October 2nd,

1857.

JOHN H. HARRIS

Printer and Stationer, No. 100 Broadway, New York.

1857

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OFFICIAL REPORT

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CALIFORNIA

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CATTLE SHOW

AND

INDUSTRIAL EXHIBITION,

HELD AT STOCKTON, SEPTEMBER 29th, 30th, OCT. 1st AND 2d,

1857.

SAN FRANCISCO:

O'MEARA & PAINTER, BOOK AND JOB PRINTERS,

108 CLAY STREET, NEAR SANBOME.

1858.

CONSTITUTION

OF THE

CALIFORNIA STATE AGRICULTURAL SOCIETY.

ARTICLE I.

SECTION 1. This Society shall be called the CALIFORNIA STATE AGRICULTURAL SOCIETY, organized in pursuance of an act entitled "An act to incorporate an Agricultural Society, and appropriate money for its support," passed May 11th, 1854.

ARTICLE II.

SEC. 1. It shall be the object of the Society to advance the interests of all departments of Agriculture in this State.

ARTICLE III.

SEC. 1. Any individual may become a member of this Society by paying to its treasury not less than ten dollars annually.

SEC. 2. Honorary members may be elected at any Annual Meeting.

ARTICLE IV.

SEC. 1. The Officers of this Society shall be a President, seven Vice Presidents, Corresponding Secretary, Recording Secretary, and Treasurer.

SEC. 2. The Officers shall be elected at the Annual Meeting, and shall hold their offices until the first of January following.

SEC. 3. The Officers of the Society shall constitute a Board of Directors, and shall have the control and management of all the prudential and fiscal concerns thereof, and shall make a full report of their proceedings to the Society at its Annual Meeting, and also at the expiration of their term of office.

SEC. 4. Any five members of the Board shall, when convened, constitute a quorum.

SEC. 5. The President, one Vice President, the Recording Secretary, the Corresponding Secretary, and the Treasurer, shall constitute an Executive Committee, who shall transact all business of the Board of Directors, and shall make a full report of their doings to the Board, subject to the approval of the same, at least one day prior to the Annual Meeting of the Society.

SEC. 6. The Recording Secretary shall keep a full and fair record of all the proceedings of the Society, the Board of Directors, and the Ex-

ecutive Committee; and shall at all times hold the same subject to the inspection of any member of the Society. He shall also make an annual report of the expenditures of the Society, and forward copies of the same to the Committee on Agriculture of the Senate and Assembly of this State.

SEC. 7. The Corresponding Secretary shall conduct the correspondence of the Society, and have charge of the rooms of the Society, under the direction of the Executive Committee.

SEC. 8. The Treasurer shall keep the funds of the Society, and disburse them only on the order of the Executive Committee, signed by the President and Recording Secretary, and shall make, at the Annual Meeting, a detailed report of all receipts and expenditures of the Society for the year, and shall give bonds in the sum of ten thousand dollars, to be approved by the Executive Committee.

SEC. 9. The Executive Committee shall take charge and have the control of all seeds, plants, books, models, etc., which may be transmitted to or received by the Society, and shall have charge of all communications designed for publication, and shall collect, arrange and publish the same, in such manner as they shall deem best calculated to promote the objects of the Society.

ARTICLE V.

The Annual Meeting of the Society shall be held at such time and place as the Board shall direct.

ARTICLE VI.

The Society shall annually hold a Fair and Cattle Show, at such time and place as shall be designated by the Board.

ARTICLE VII.

SEC. 1. The Board and Executive Committee, respectively, shall have power to fill all vacancies occurring in their numbers.

SEC. 2. The Board shall have power to call special meetings of the Society, at which thirty members shall constitute a quorum.

ARTICLE VIII.

This Constitution may be amended by a vote of two-thirds of the members present, at any Annual Meeting.

INTRODUCTION.

SINCE the culture of the earth and the breeding of animals for the uses of man became a science, or, rather, since certain fixed sciences were applied to these vocations, it has become a leading object of theoretical and practical men to reduce the numerous branches of industry, included under the general denominations of farming and mechanical pursuits, to certain systems. In furtherance of this purpose, societies have been formed in nearly all the states of Europe, as well as of America, to collect and disseminate information drawn from individual experience and enterprise. Long before the existence of California as a state of the Union, the utility of these organizations was demonstrated in the vast improvements that had been effected everywhere in the cultivation of the soil, in the rearing of domestic animals, in the enhanced dignity of manual labor, and in the innumerable benefits to the human race, morally, mentally, physically, politically and pecuniarily, resulting directly from the change of farming from a mere routine of ignorant drudgery to an elevated and intelligent system of scientific labor.

The moment that California began to develop features of an agricultural character, educated and practical men became to turn their attention, as far as circumstances would permit, to the formation of an agricultural society, looking to the ultimate good to be derived by the present as well as future generations by their labors. Mind met mind, and energy elicited energy, until, on the 11th day of May, 1854, the State Legislature passed an act incorporating the State Agricultural Society, and appropriating an annual sum for its maintenance. In pursuance of this act of incorporation, the Society was formed in April, 1854, and proceeded with its work. Despising not the day of small things, the Society moved on from year to year, constantly gaining in strength and usefulness, notwithstanding a defective charter, a parsimonious appropriation, and all the difficulties incident to a new and sparsely populated country. At the third annual meeting, and fair, in September, 1856, the business of the Society was placed in the hands of the board of managers, under whose auspices the business of the Society has been conducted for the past year, and whose stewardship is

now reported. The board, like their predecessors, have labored under many and serious disadvantages, that it is hoped will be obviated in the future by the experience of those who have performed the work of inaugurating a great and useful state institution.

The charter of 1854 is defective in several vital particulars, and should, when renewed, be materially amended. The only point to which it is necessary to refer here, is that provision that requires the officers to be elected annually. In the nature of the duties to be performed, it is impossible for any set of officers to become, in less than a year, sufficiently familiar with the details of the business of such an organization to be more than prepared to commence work practically, and to the ends contemplated in the formation of the Society. After the close of the first year of their service, they are able to see what is necessary to be done to give the greatest degree of usefulness to the institution, and they cannot, practically, see this sooner. The retiring board have found this defect of the charter the greatest obstacle to the efficient performance of their duties. It may not be out of place, therefore, to express the hope that, when a new incorporation is granted, the powers of the Society may be extended, in this regard, so far as to permit the election of executive officers for a series of years. If that be done, with other emendations, shown by experience to be necessary, the Society will advance rapidly to the condition of prosperity and usefulness to the agricultural and other industrial interests contemplated in its original formation.

Under all the difficulties and embarrassments that have cramped the labors of the Society, great results have followed their efforts, as the fourth annual report demonstrates.

FOURTH ANNUAL FAIR

OF THE

California State Agricultural Society.

MINUTES OF MEETINGS.

BOARD OF MANAGERS.

SACRAMENTO, March 10th, 1857.

At a meeting of the Board of Managers of the State Agricultural Society, held at Sacramento, March 10th, 1857, the meeting was called to order by Wm. Garrard, first Vice President. The following gentlemen were present: Dr. J. C. Cobb and Wm. S. Daniels, of San José; Wm. Garrard, of San Joaquin; Andrew Wolf and George H. Sanderson, of Stockton.

On motion of Wm. S. Daniels, the Board went into an election of a President to the State Agricultural Society, to fill the vacancy caused by the resignation of C. M. Weber, and WM. GARRARD was unanimously elected President of the Society.

On motion of A. Wolf, Dr. E. S. HOLDEN was elected first Vice President, in place of Wm. Garrard, promoted to the Presidency.

On motion of Wm. S. Daniels, Tuesday, 29th day of September next, was chosen as the day to commence the State Fair, and that it should continue four days.

Bills were presented by Warren & Co., for twenty copies of the "California Farmer,"—amount, one hundred dollars; also, a bill for wood, water, stationery, &c.,—thirty-six dollars; which, on motion, were laid upon the table for the present.

Geo. H. Sanderson and Dr. J. C. Cobb were chosen a committee to lease the room heretofore occupied by the Society, at Sacramento.

At 11, A. M., the Board took a recess for one hour.

At 12, M., the committee appointed to lease the room reported that they had leased the room for six months, from March, 1857, at the rate of seventy-five dollars per month.

On motion, the Secretary was ordered to procure a sign for the Society, and have it placed over the door of the Society room.

On motion, Dr. J. C. Cobb was authorized to pay the premiums which have been awarded, but not paid, and to present his account to the Secretary.

On motion, the Board adjourned, to meet in Stockton on the first Wednesday in May next.

WM. GARRARD, *President*.

GEO. H. SANDERSON, *Recording Secretary*.

STOCKTON, May 6th, 1857.

The Executive Board met at the City Hall at 10 o'clock, A. M., the President in the chair.

The minutes of the last meeting read and accepted.

Andrew Wolf, Treasurer of the Society, tendered his resignation, which, on motion, was accepted.

P. E. Connor was chosen Treasurer of the Society, to fill the vacancy. On motion, the meeting adjourned, to meet at 3, P. M.

At 3 o'clock, P. M., the Rules of Government for the State Fair were adopted, as follows:

ARTICLE I.

All members of the California State Agricultural Society will be furnished with a badge of membership, upon payment of the membership fee of ten dollars, and will be expected to wear the same during the Fair.

This badge will admit the ladies of his family, and children under fifteen years of age.

ARTICLE II.

Price of single admission, to the Fair or Cattle Show, fifty cents. Single admission to both, one dollar. Season tickets, admitting a gentleman and lady to all the exercises at the Hall, and at the Show ground, five dollars. Season tickets, admitting one person, as above, three dollars. Clergymen, editors, and delegates from Agricultural Societies, will be presented with a complimentary card of admission, on application at the Secretary's office.

ARTICLE III.

Any person desiring to send articles or animals for exhibition at the State Fair, on producing a certificate of membership of the State Agricultural Society, for the present year, will receive a free pass for said articles or animals on any steamer belonging to the California Steam Navigation Company. Any such pass, having been countersigned by the first Vice President or Recording Secretary of the Society, will entitle the bearer to return the articles or animals, enumerated therein, on the boats of the Steam Navigation Company, free of charge.

ARTICLE IV.

All exhibitors, who intend to compete for the premiums of the Society, should become members of the same, and have their articles on the ground, and entered at the Secretary's desk, in the City Hall, at or before three o'clock on Monday, September 28th, without fail, so that they may be arranged in their respective departments, and in readiness for examination, by the Judges, on Tuesday, at 10, A. M.

ARTICLE V.

The regulations of the Society must be strictly observed by exhibitors, otherwise the Society will not be responsible for the omission of any article or animal not entered under its rules.

ARTICLE VI.

No article or animal, entered for a premium, can be removed or taken away, without special permission, before the close of the exhibition. No premium will be paid on articles or animals removed in violation of this rule.

ARTICLE VII.

All articles and animals, entered for exhibition, must have cards attached, with the number, as entered at the Secretary's desk; and exhibitors, in all cases, must obtain their cards previous to placing their articles or animals on the Fair grounds.

ARTICLE VIII.

Those who wish to offer animals or articles for sale, during the Fair, must notify the Secretary of such intention at the time of entering.

ARTICLE IX.

The Executive Committee will use every precaution in their power for the safe preservation of all articles and stock on exhibition. Exhibitors must give their attention to their articles or animals during the Fair, and at the close of the exhibition attend to their removal.

ARTICLE X.

Except where ladies are invited to act as Judges, the Awarding Committees will, in every instance, be composed of members of the Society, and no person will be permitted to act as Judge in any department in which he is a competitor.

ARTICLE XI.

In no case can the Judges award special or discretionary premiums, but will recommend to the Executive Committee any articles in their class which they may deem worthy of special notice, and for which a premium has not been offered.

ARTICLE XII.

The Judges on Animals will have regard to the symmetry, early maturing, thorough breeding, and characteristics of the breeds which they judge. They will make proper allowances for the age, feeding and con-

dition of the animals, especially in the breeding classes, and will not give encouragement to over-fed animals.

ARTICLE XIII.

No stock of inferior quality will be admitted within the grounds. A committee will be appointed to rule out all below a medium grade.

ARTICLE XIV.

Animals, to which premiums have been awarded, must be paraded around the track, that visitors may see the prize animals.

ARTICLE XV.

No person will be allowed to interfere with the Judges during their adjudications.

ARTICLE XVI.

The several Superintending Committees will give particular direction to all articles in their department, and see that all are arranged in the best order possible to lessen and facilitate the labors of the Judges in their examination.

ARTICLE XVII.

The Superintendents will attend each set of Judges, in their respective departments, and point out the different articles or animals to be examined; will attach prize cards to the articles, or flags to the successful animals, after the reports of the Judges have been made up and delivered to the Chairman of the Executive Committee.

ARTICLE XVIII.

The Judges will withhold premiums on animals or articles, which, in their opinion, are not worthy.

ARTICLE XIX.

The Chief Marshal, with efficient aids, will be in attendance during the hours of exhibition, to keep proper order.

ARTICLE XX.

Animals, when duly entered, will be well provided for by the Society, without charge to the owner, and cannot be removed except by permission of the Executive Committee.

ARTICLE XXI.

All machines, implements, or other products of mechanical art, must be exhibited by their respective makers or inventors, or improvers, or their assignees, to or for whom only, premiums of such articles will be awarded.

ARTICLE XXII.

Every machine or implement offered for a premium must be so designated or described as to identify it to future purchasers, and also the selling price of the article must be stated and marked on the labels and in the published report of premium articles.

ARTICLE XXIII.

Efficiency, cheapness and durability will be regarded as chief excellences in every machine or implement.

ARTICLE XXIV.

The Chief Marshal will call the Judges at 10 o'clock on Tuesday morning, assemble them at the Secretary's room, furnish them with blank books, in which to register their awards, and have the Judges conducted, by the Assistant Marshals, to their respective departments of the Exhibition.

ARTICLE XXV.

The Marshal and his aids shall give particular attention to the proper arrangement of all articles exhibited in their respective departments, point out the articles or animals to the Judges, and otherwise facilitate the examination by the Judges.

ARTICLE XXVI.

Parties to whom premiums have been awarded, shall have the choice to receive the same in money, silver plate or diplomas.

MINUTES OF THE ANNUAL MEETING,

HELD AT STOCKTON, OCTOBER 1, 1857.

The Annual Meeting of the State Agricultural Society convened at the Methodist Episcopal Church, South, at 9 o'clock A. M.; the President, William Garrard, in the chair. The minutes of the last annual meeting were read, and, on motion, the whole matter was laid on the table for the present.

Motion made that the Treasurer make his report immediately. This motion was amended, and the Treasurer was allowed further time to report.

W. B. Osborne, of Los Angeles, presented himself as a delegate from the New York State Agricultural Society.

Judge Daniels reported that himself and five other gentlemen were present as delegates from the Horticultural and Agricultural Society of Santa Clara.

On motion, the minutes of the last year's annual meeting were taken from the table and adopted.

The following amendments to the Constitution were offered by Mr. Crocker:

"The Office of this Society shall be permanently located at the City of Sacramento, and the Corresponding Secretary shall be a resident of that city."

On motion, this amendment was laid upon the table for the present.

The following resolution was offered by Mr. O. C. Wheeler, of Sacramento:

Resolved, That the subject of the permanent location of the Fair of this Society be referred to a select committee of five, to report at the next annual meeting.

The following gentlemen were appointed as the Committee: O. C. Wheeler, of Sacramento; G. H. Beach, of Marysville; Wilson Flint, of Alameda; Wm. Daniels, of Santa Clara; and Dr. E. S. Holden, of Stockton.

Motion made by Mr. Myers, of Alameda, that we now go into election for choice of place to hold the next Annual Fair. Carried.

On motion, the Society adjourned to meet at the Circus Tent, the church being too small to hold the members of the Society.

At the expiration of fifteen minutes the meeting again organized.

Nominations now being in order, Mr. Wilson Flint nominated Marysville; Mr. Crocker nominated Sacramento; Mr. Osborne nominated

Los Angeles; Mr. Harsten Amyx nominated Stockton; Mr. Carpentier nominated Oakland.

Nominations being closed, motion made that we vote *viva voce*. This motion was lost. A division being called for, Hon. S. Purdy and Gen. Bridges were appointed tellers. It was decided to vote by ballot.

San Joaquin County, or Stockton, was withdrawn from the nomination, by Mr. H. Amyx.

Motion made and carried, that the Secretary call the names of the members, and that the members present deposit their ballots as their names were called.

The Chair appointed Messrs. Crocker, Flint, Amyx and Carpentier tellers.

The vote stood as follows: Whole number of votes cast, 412. Marysville received 168 votes; Sacramento, 149; Stockton, 6; Oakland, 68; Los Angeles, 1.

There not being a majority of votes cast for either of the above localities, there was no election.

Gen. Hutchinson withdrew Sacramento from the nomination. Mr. Carpentier withdrew Oakland from the nomination.

Marysville was then chosen by acclamation.

The following gentlemen were elected, by acclamation, officers of the Society for the ensuing year:

President—JOHN C. FALL, of Marysville.

Vice Presidents—G. N. SWEETZ, of Marysville;

G. C. YOUNT, of Napa;

Maj. JOHN BIDWELL, of Butte;

Dr. C. M. HITCHCOCK, of San Francisco;

Dr. HORACE W. CARPENTIER, of Alameda;

JOSE M. COVARRUBIAS, of Santa Barbara;

J. D. MORLEY, of Stanislaus.

Corresponding Secretary—O. C. WHEELER, of Sacramento.

Recording Secretary—GEORGE H. BEACH, of Yuba.

Treasurer—J. A. PAXTON, of Marysville.

The amendment to the Constitution making Sacramento the permanent location for the Office of the Society, was now taken from the table, and the amendment adopted.

On motion, the Executive Committee were authorized to call an Agricultural Convention, in the city of Sacramento, on the third Wednesday in January, 1858.

On motion, a vote of thanks was presented to Hon. Henry Eno, of Campo Seco, Calaveras County, for his able address, and that he be requested to furnish the Society with a copy of the same for publication.

On motion, in addition to the regular salary, the sum of five hundred dollars was awarded to the Recording Secretary, provided any funds were left in the treasury after paying the expenses of the Society.

On motion, the thanks of the Society were presented to the citizens of Stockton, for their hospitality and their efforts in aid of the Society.

On motion, the following resolutions were unanimously adopted:

Resolved, That the thanks of this Society be tendered to the California Steam Navigation Company, for their liberality in the transmission of stock and various articles of produce to our Annual Fair, and for courtesies extended to the Executive Committee.

Resolved, That the thanks of this Society be tendered to the Trustees of the M. E. Church, South, for their kindness in allowing us the use of their church.

Resolved, That the thanks of this Society be tendered to Wells, Fargo & Co.'s Express, for transmission of letters and packages, free of charge, to all parts of the State.

Resolved, That the thanks of this Society be tendered to the ladies of the different committees, for their promptness and efficiency in the discharge of the duties assigned them.

On motion, the meeting adjourned, to meet at 7 o'clock at the Committee Room.

At 7 P. M., the Society organized in the Awarding Committee Room, President Garrard in the chair; O. C. Wheeler, Secretary, *pro tem*.

On motion of A. H. Myers, of Alameda, it was

Resolved, That Hon. Wilson Flint be the delegate of the Society to the United States Agricultural Society, the American Pomological Society, the Agricultural Societies of the States of New York, Vermont, New Hampshire, and any other State Agricultural or Horticultural Society he may be able to attend during the ensuing year.

The Treasurer's report being called for, P. Edw. Connor, Treasurer, made a partial report, as follows:

Receipts, about \$13,000: probable expenditures, about the same.

On motion, the Treasurer was allowed further time to report to the Board.

On motion of A. H. Myers, the thanks of this Society were tendered to Mr. James R. Lowe, for the very efficient services which he has rendered the Society during this and our previous Annual Fair, in adorning the halls and in the general arrangement of the articles on exhibition.

On motion of Dr. G. W. Wooley, it was

Resolved, That all persons within the boundaries of the State of California be invited to present, at the next Agricultural Fair, any facts in relation to the medical qualities of plants and minerals that may have come to their knowledge, and that premiums be offered to such as are thought worthy.

On motion of A. H. Myers, it was

Resolved, That we suggest to the Board of Managers the propriety of holding the next Annual Fair at an early day in September.

On motion, the Society adjourned *sine die*.

GEO. H. SANDERSON,
Rec. Sec'y State Agricultural Society.

REPORT OF THE VISITING COMMITTEE,

ON

FARMS, ORCHARDS, VINEYARDS, &c.

The undersigned, having been appointed a committee to visit and report upon farms, orchards, vineyards, etc., throughout the state, in submitting the following result of their labors, deem it proper to premise that, to present a general and correct view of the agricultural and horticultural interests of the state, involved the necessity of much travel and no inconsiderable amount of repetition, in order to examine the more important localities under such a variety of circumstances as would do justice to all. This fact will account for our frequent reference to the same place. We would also further state, that it was found very difficult for the same persons to devote sufficient time to visit all portions of our extensive field, but some one or more of the undersigned visited each place named; and the whole, as a report, is assented to by all.

Leaving Stockton on the 8th of June, we reached Sacramento on the same evening, and on the morning of the 9th visited the extensive grounds of A. P. Smith, three miles from Sacramento, on the American River. The "Pomological Gardens" of Mr. Smith cover sixty-five acres of ground. (The proprietor, in this, as in all cases in this report, is our authority for the statistics.) The flower garden is large and beautiful, surrounded by a splendid Escalonia hedge. This garden contains not only a large variety of rare flowers, but also many tropical trees, both fruiting and ornamental, all arranged with excellent taste, and cultivated with much skill. Passing thence, we examined the orchard, nursery, vineyard and vegetable garden. In the latter we found one set of men gathering mature vegetables for the market, while another was cultivating those half grown, and still another planting seed of the same sort. And this is going on continually. Mr. Smith keeps four wagons running into Sacramento, with vegetables, the entire year. It is usual for him to have cucumbers in market on the first of January.

His grounds are watered by means of a ten horse power steam pump, capable of throwing ten thousand gallons per hour into a reservoir fourteen feet above the surface. From this reservoir the water is conducted through more than six thousand feet of twelve inch earthen pipe, under ground. To these pipes are attached twenty hydrants, from which the water is distributed upon the surface through four thousand five hun-

dred feet of canvas hose. The soil is a sandy loam to the depth of twenty-five feet.

He has fruit trees as follows: pear, thirteen thousand, in one hundred and eighty varieties; apple, fifteen thousand, in one hundred and sixty varieties; twelve thousand cherries, in eighty varieties; seventeen thousand peach, sixty varieties; five thousand plum, seventy varieties; thirty-five thousand nectarines, twenty varieties; five thousand apricot, fifteen varieties; two thousand almond, two varieties; ten thousand grapes, sixty varieties; fifteen hundred gooseberries, twenty varieties; two thousand currants, six varieties; eight thousand raspberries, six varieties; together with a large amount and variety of strawberries, mulberries, figs, pomegranates, etc., etc. His seedlings in nursery, being a portion of his stock in process of cultivation for 1858, are as follows: twenty thousand pear, and fifteen thousand cherry.

Of ornamental, forest and timber trees, he has ten thousand locusts, eight thousand acacias, six thousand laburnums, five thousand elms, twenty-five hundred catalpas, five thousand maples, lindens, mountain ash, and other varieties. Of ornamental shrubs, he has over ten thousand, of one hundred varieties, embracing many of the choicest kinds to be found on the continent.

His roses number more than twelve thousand plants, ranging through more than two hundred varieties, and comprising, it would seem, everything desirable in this "Queen of Flowers."

His stock of pines, firs, cedars, and other evergreens, numbers over fifteen thousand trees. He has, also, eight thousand Osage orange plants, set in hedge.

In the green-house department he enumerates some thirty thousand specimens, comprising some very rare plants. His stock of camellias is by far the largest in the State, containing over two thousand plants, of two hundred varieties.

Of hardy climbers, he has about thirty varieties, that have withstood the last two winters. For several years he has grown all his vegetable seeds, thus avoiding much disappointment to which all are subjected who plant imported seed. Last year he had for sale over four thousand pounds of fine fresh seeds, and this year has promise of a much larger crop.

He has three fine green-houses, each one hundred feet in length, fine dwelling-house, barn, and separate houses for his men to eat and lodge in.

Our next visit was to the farm of J. C. Davis, on Putah Creek, in Yolo County, sixteen miles from Sacramento. This farm contains eight thousand acres of land, sixteen hundred of which are inclosed with a substantial five board fence. The remainder is used for grazing purposes. This section of country has suffered much this season from the unusual drouth, no rain having fallen since February. Mr. Davis has about four thousand head of cattle and two hundred horses and mules. Besides a large and commodious dwelling, he has extensive barns and barnyards, butcher shop, blacksmith shop, and a flouring mill, driving two runs of stones. He irrigates his ground by means of a ten horse power

steam pump, with which he raises the water from the bed of the creek about fifty feet, into a large tank, whence he conducts it, in lead pipes, to his house, barn, orchard, vineyard, etc. Under his tank he has a spacious and cool dairy-house. We found his orchard, containing apple, pear, peach, plum, apricot, nectarine, fig and almond trees, in large numbers, looking finely, and promising an abundant fruit crop. His vineyard is in full bearing, and, like his orchard, shows that, in addition to an excellent soil, they have skillful and thorough cultivation. His family vegetable garden we found very extensive, and enjoying its due proportion of care. His stock appears to be of the best and choicest breeds. Among his animals, we saw some hogs of unusual size and beauty, four jacks, recently imported at a cost of more than two thousand dollars each, a fine Devon cow, which cost five hundred dollars, also, three of her calves, and three American bulls; all very superior specimens.

From Mr. Davis', we went to the farm of Mr. F. Werner, distant four miles. Mr. W.'s occupation is the importation of stock and the improvement of native breeds, in which he seems to spare neither pains nor money. He has large numbers of the finest native and half-breed horses and cattle in his pastures, and in his barns several imported "Black Hawk," "Trustee" and "Missinger" blooded stallions, which cost large sums in the east, and are supposed by many to be the finest in the state.

Two miles above Werner's we entered upon the extensive farm of Hutchinson & Green, containing six thousand acres, of which nearly two thousand are under fence, and cultivated with wheat, barley, oats, etc. Their grain shares the same fate with most other in this vicinity this year, viz: it is light. They sowed about the first of January, and rain has fallen on it but once since. Besides the dwelling-house, they have separate shops and tools for their blacksmith, saddler, wagon-maker, etc., a fine chicken yard, and a small orchard of young trees, about fifty cows, and one hundred and twenty-five head of horses and mules, and five hundred hogs. They have twenty wagons, fifty plows, twenty-five harrows, two eight horse power threshing machines, seven reapers and mowers, four hay presses, and other implements corresponding in number and variety with those enumerated.

Ten miles farther up the Putah we came to the farm of M. Wolfskill, who has a vineyard of some six thousand vines, a number of fine fig trees, six years old, apricots, (from Mexico,) fully ripe, and a small orchard of peach, apple, pear, plum, and other usual varieties of trees.

Mr. John Wolfskill, brother of the last named, lives two miles farther up the creek. His vineyard contains nine thousand vines, and his orchard eighteen hundred trees, consisting of apples, pears, peaches, plums, cherries, apricots, almonds, walnuts, olives, figs, pomegranates, etc. He also has one thousand trees in nursery. His apricots were fully ripe, and very fine. He has already sold in Sacramento market, this year, from six trees, two thousand pounds, at seventy-five cents per pound. His fig trees are six years old, and the largest in this section of the state. One of them measures two feet four inches in circumference, and is thirty feet high.

He irrigates by raising water from the Putah by steam, at the rate of eight hundred gallons per minute. He has three hundred and fifty head of horses, and two hundred head of cattle. His apricots and his fruiting cactus, brought from Mexico six years since, have made a luxuriant growth, and are now in full fruit.

Having returned to Sacramento, and taken steamer, we reached "Hock Farm," the present home of the noble pioneer, Gen. J. A. Sutter. This is a fine, healthy location, six miles below Marysville, on the west bank of the Feather River. "Hock Farm" has upon it twenty-five hundred grape vines in full bearing, besides a large number of smaller ones, of many choice varieties. Also, five hundred peach, four hundred fig, fifty pomegranate, and a large number of almond and olive trees, all in bearing; and twenty-five hundred trees in nursery. Gen. Sutter has made both wine and brandy, of excellent quality, during the last year, and in considerable quantities. His grounds are irrigated from a well, sixty feet deep, the water being raised by steam power, and distributed over his grounds in wooden flumes. He has fifteen hundred feet of Osage orange hedge, in fine condition. Among his ornamental trees are some fine oriental cypress, together with many rare and beautiful shades, which, being well arranged in the magnificent grounds, laid out in the "old English style," present a scene of rare interest and beauty. On the farm are about thirty Indians, the remnants of four distinct tribes, much attached to the General, to whom they render obedient and efficient service.

Wishing many blessings upon the old gentleman and his family, we bade them adieu, and crossed the river to the extensive orchard and nursery of Mr. George H. Beach, four miles below Marysville. Mr. B.'s farm contains three hundred and twenty acres of land, about equally divided between river bottom and prairie. The elegance of the Gothic cottage, and the classic arrangement of the spacious ornamental and fruit yard in front of it, are a compliment to the taste of the enterprising proprietor of these "New England Nurseries." Near the house is an artesian well, three hundred feet deep, in which the water rises to within a few feet of the surface, whence it is elevated by horse power for the use of the house and front yard. On this place we found, of bearing trees in orchard, three thousand peach, of seventy-eight varieties, five years old; fifty plum, four years old; seventy-five apricot, five years old; fifty cherry, ten nectarine, twenty-five dwarf pear, and fifty standard pear, all five years old. Of trees two years old: two hundred apple, one hundred cherry, fifty plum, two thousand peach, one hundred dwarf pear, twenty-five fig, of four varieties. Also, five thousand grape vines, of more than forty varieties, from two to five years old; three acres of strawberries, of ten varieties; one acre of raspberries. In nursery, there are six thousand "Pride of India" trees, ten thousand locusts, one thousand alanthus, and about two thousand elm, ash, acacia, etc.; twenty-five thousand peach, apricot, nectarine, plum and almond; three thousand apple, one thousand pear, one thousand cherry, one thousand quince, one thousand fig, twelve varieties; twenty thousand grape vines, two thousand roses; also, a large quantity of flowers, shrubbery, evergreens,

etc. All kinds of the fruit seen in this orchard were very fine, and showed great care and skill in their culture. Mr. Beach has a variety of peach, which he raised from seed, that is said to be of superior size and quality, but it being still unripe, the committee could not judge of its merits.

Mr. Beach waters his grounds from a well, twenty feet long, ten wide, and some forty deep. The water is thrown into a large tank, elevated some twelve feet above the surface, by means of a steam pump, throwing ten thousand gallons per hour, and is thence distributed in wooden flumes. The soil is a light, sandy loam. Taken as a whole, the "New England Nurseries" bear unmistakable marks of skill, energy and enterprise.

The committee next visited the fine house and grounds of John C. Fall, Esq., of Marysville. Mr. F.'s place is a large, city lot, and is filled with objects of interest. The tasteful "plan" of the grounds, the elegant mansion, the gothic summer-house and green-house, the choice selection of plants, shrubbery and trees, all bespeak a rare degree of refined culture in the mind of the proprietor. The native soil being too cold and heavy, Mr. F. has brought on and made an entirely new soil.

We also visited the fine grounds of Rev. Mr. Walsworth, whose garden contains many trees, plants and shrubs, in fine growing condition, and several in full bearing.

From thence we went to the place of Mr. Lindley, who has a large number of trees, which show a very rapid growth. Mr. Lindley's grape vines, covering his entire house, and, at the same time, loaded with fine fruit, would seem to controvert the theory, that in California the vine must be kept down to a short stump in order to fruit well. His locust, catalpa, and other ornamental trees, not only indicate the high culture they receive, but go far to show the perfect adaptation of such trees to this soil and climate.

About three miles from the city, we were highly pleased with the noble and stanch manner in which Col. Zabriskie has built his house and conducted his farm. His grain crop, both Indian corn and the smaller grains, promises well.

Mr. Briggs, in the same neighborhood, has a large nursery, but as he was not at home, and we could obtain no reliable information, we can make no report.

On the bank of the Yuba River, and near the city, is the Quintery Farm of Messrs. Pinnex & Cameron, containing four hundred acres, three hundred of which is laid down to alfalfa, and is divided by a good fence into three fields, in which they herd or feed stock for hire. This is their business; and so good is it, that while they charge just twice as much per month as their neighbors, who feed with the ordinary grasses, they cannot take half as many head as are offered to them. Their terms are three dollars per month per head, and they limit the number to two hundred. The field into which the cattle had just been turned (they feed down the fields alternately,) had been fed down twice this season, and now the clover is nearly three feet high, and in bloom. While all other grasses and clovers, under similar circumstances, are perfectly dry

and yellow, the alfalfa exhibits the most fresh and luxurious green. The roots of this clover run down through a close soil till they reach water, though the same be twenty feet below the surface. Last year's freshet washed away the bank of the river, and exposed the roots about twenty feet below the surface. On this place is a fine pomegranate hedge, and a variety of foreign pears and grapes, all in fine, healthy condition.

Fifty miles (*via* Oroville,) from Marysville, on Chico Creek, is the extensive farm of Major Bidwell, containing five leagues of land; four hundred acres of which is under fence. Mr. B. has an orchard of twelve hundred trees, yielding large annual crops of fruit, for which he finds ready market near at hand; also, a vineyard of fifteen thousand vines and a nursery of twenty thousand trees. He has a large number of very fine Catawba grape vines, in full bearing. He spares no pains nor expense in the cultivation and improvement of his place, in every department. He has twenty-five Indians constantly employed on his place, and not unfrequently from fifteen to twenty white men. His dwelling is a large two-story adobe building, with balcony all round, and containing twenty-five rooms. He has, also, a large wooden building, two stories high, the lower part used as a store, and the upper as a Masonic Hall. His Indians live in a cluster of substantial adobes, arranged in the form of a cross. His granary, blacksmith shop, and wagon-maker's shop, are built of adobes, and are all two stories high. His barn is very large and airy, and contains stalls for twenty-five head of stock. His flouring mill drives two runs of stones, and, like all his other buildings, presents an air of cleanliness and adaptation highly complimentary to his taste and judgment. His mill is run and his grounds are irrigated by water brought from Chico Creek, in a canal about one mile in length, twelve feet in width, and six in depth. He has two hundred and twenty-five acres of wheat, seventy-five of barley and oats, and eight acres of corn; six hundred head of cattle, and five hundred horses and mules. His cattle are nearly all half-breed, American and Spanish. His American stallions and bulls, imported at great cost, are of superior quality. He settled on this place in 1849, and has expended large amounts of money every year in improving it. Most heartily do we wish "success to such enterprise."

Samuel Brannan has a farm of two thousand six hundred acres, on the banks of the Feather River, opposite Nicolaus, finely fenced with red-wood posts and boards. He has upon this farm seven hundred head of cattle, one hundred head of horses, and twelve hundred sheep. Having turned his attention to the growing of stock, Mr. B. has wisely commenced the importation of the best and purest blooded animals to be found in Europe or America; an enterprise which, we think, will prove a more profitable investment than his best rows of granite and marble buildings in San Francisco.

On the 19th of July, the committee commenced another tour, extending through Sacramento, Yolo, Solano, Napa and Sonoma counties.

From Stockton to Woods' Ferry, twelve miles, half the distance on either side of the road, are fine fields of wheat and barley, ranging from one hundred to one thousand acres each, yielding, on an average, twenty-five bushels to the acre. Mr. Woods has ten acres of English oats,

which will produce from fifty to seventy bushels to the acre. We measured some stalks, which proved to be ten and one-half feet high.

The bottom lands of the Calaveras, Mokelumne and Cosumnes rivers are composed of a rich, sandy loam, similar to that of the American, Feather, Yuba and Sacramento rivers, well adapted to the growth of luxuriant crops, and, for the culture of fruit trees, fully equal to any in the state. Here the price of land is low. The grain in this section, from twenty to thirty miles on each side, superior to any in the state, will yield from twenty-five to seventy bushels per acre. Notwithstanding the long and severe drouth of the season, the clear, deep, green foliage upon the banks and bottom lands and creeks, presents a fine appearance, luxuriant and quite tropical.

From Woods' Ferry to Hicks' farm, thirteen miles, we saw not more than five or six fields of grain, say fifteen hundred acres, looking well, producing about twenty-five bushels per acre. Mr. Hicks has a splendid farm, containing three leagues, situated on the Cosumnes River: four hundred acres under high cultivation, fine orchards, gardens and vineyards; also, four thousand head of cattle and horses, two hundred milch cows. Here grain is good; average yield over thirty-five bushels per acre. The river scenery is beautiful, and the land equal to any in the state.

From Hicks' Farm to Sacramento, twenty miles, there are but few fields of wheat or barley; all looking poorly.

At Sacramento we were joined, and accompanied for several days, by Mr. A. P. Smith, proprietor of the "Pomological Gardens," from whose experience, counsel and suggestions, your committee was materially aided.

Four miles from Sacramento, we passed over a hard, smooth turnpike, four miles long, made over the tules by ditching on either side six feet deep. This road at all seasons is the best in the state, and is a mode worthy of being adopted through tule swamps. While upon the subject of the tule, we take the opportunity of recommending the free use of tule muck, or soil, for gardens and planting fruit trees in, when it can be easily obtained. This is a decayed vegetable substance, and with a little addition of fine sand, or old manure, will produce astonishing growths.

Passing through Yolo County, we followed for several miles the Putah Creek, and noticed quite a number of large, beautiful farms, well fenced and under good cultivation. Yolo County ranks among the first in the state for grazing and agricultural purposes. It has under cultivation thirty-eight thousand three hundred acres; wheat raised in 1856, two hundred and sixty-six thousand bushels; barley, three hundred and fifty thousand bushels; oats, twenty-two thousand bushels; fruit trees, twenty-four thousand three hundred and eighty-five; grape vines, two hundred and sixty-nine thousand; horses, three thousand five hundred; mules, four hundred and fifty-seven; cattle, nineteen thousand; sheep, thirteen thousand seven hundred; hogs, thirteen thousand six hundred. The soil on the creeks is a deep, rich loam; in other sections, a black loam, and clayey.

Leaving Yolo County, we passed into Suisun Valley, which is sparsely

settled, though it has a productive soil and is a large and handsome valley. The wild oat grows here luxuriantly, which is cut for hay, and thousands of tons are sent to market yearly, and sold at from fifteen to twenty-five dollars per ton. Number of bushels of wheat and barley raised this season, two hundred and seventy-five thousand. In this valley, at the foot hills, four or five miles from Suisun City, is a large quarry of elegant marble, of a variegated kind. For beauty and utility, it is said to be equal to the best in the world. Also, not far distant, is a quarry of white marble, not inferior to the former.

From Suisun Valley, passed the foot hills to Suscol, one hundred miles from Stockton, and spent the night with the Messrs. Thompson, proprietors of the extensive and celebrated orchard and nursery, where we were most generously entertained. These gentlemen are the pioneers of this state in fruit culture, having planted their orchard in 1853. Their orchard and vineyard contain one hundred and forty acres, nursery twenty-five acres, handsomely fenced in, and partly surrounded by wide double avenues, four miles in length, lined on either side by fruit and ornamental trees, which serve the double purpose of breaking off the wind, and affording an extensive park, or drive. The orchard contains ten thousand peach trees, all in full bearing; three thousand six hundred apple; two hundred and fifty apricot; eighty quince; one thousand plum, eighteen varieties; fifty cherry, fifteen varieties; six hundred soft shelled almond; fifteen thousand walnut; one thousand weeping willow; two hundred and fifty locust; ten thousand grape vines, thirty varieties; one thousand gooseberries; five hundred currant; two hundred pear, one hundred and fifty varieties; four thousand trees in nursery; also, fine varieties of fig, olive, pomegranate, walnut, chestnut, maple, elm, acacia, magnolias, etc. The trees are of a very large growth, all looking remarkably thrifty and green, without irrigation; substituting the cultivator, which is used often and thoroughly. Saw samples of currants, gooseberries, plums and cherries, of uncommon size and exquisite flavor. Also, large varieties of apples, on three and four years old trees, for size, flavor and prolific bearing, surpassing those grown in the Atlantic states; which is proof positive, taking into consideration apples raised in all sections of the state, that California can raise all varieties of the apple, much earlier, and far better in flavor, than any of the old states. The "Gloria Mundi" is found in all orchards, on three and four years old trees, measuring from twelve to sixteen and a half inches, weighing two pounds and over. This beautiful and extensive orchard contains seventy-eight thousand trees, comprising two hundred and fifty varieties of fruits, all in bearing. The soil is unlike any other in the state; a black, friable loam, rich and deep, well intermixed with sand and gravel.

From Thompsons we drove to Napa City, six miles. This is a thriving and pretty town, at the head of navigation, and a great thoroughfare for the thousands who pass to the celebrated Soda, White Sulphur and Hot Springs, and the wonderful Geysers. This valley is forty miles long, and from one to five miles wide, bordered by spurs of the Coast Range Mountains, which range in height from five hundred to four thousand feet, are densely covered with more than twenty varieties of

forest trees, and a large variety of evergreen shrubbery. The genuine live oak (*quercus virens*) is found in great abundance on the mountains, and will soon be sought for ship building. The Napa River, which runs the length of the valley, and the thousands of springs, gushing from the hills and mountains, afford a good supply of water for irrigation and stock.

This valley is well settled. The large farms handsomely fenced in—costly residences, surrounded by orchards and vineyards, are evidences of wealth and prosperity. Soil is very deep, rich loam, made richer by alluvial deposits, or washings from the mountains, (by the annual rains,) of decomposed vegetable and mineral substances. It is one of the Eden spots of California, and is becoming quite noted for its romantic scenery and perfect climate.

This county contains, under cultivation, seventeen thousand acres. Wheat, raised this season, three hundred thousand bushels; barley, ninety eight thousand five hundred bushels; oats, thirty-five thousand bushels; rye, corn and buckwheat, four hundred and fifty bushels; fruit trees, twenty-eight thousand. Horses, five thousand; mules, four hundred; cows, fifty-five hundred; cattle, seventeen thousand; hogs, ten thousand five hundred; sheep, four thousand two hundred.

Two miles from Napa City, Mr. N. H. Coombe has a beautiful farm, containing four hundred acres, handsomely fenced and under fine cultivation; giving full evidence of a neat and skillful farmer. Has one hundred and sixty acres of wheat, averaging forty bushels to the acre; two hundred acres of barley; five acres of corn, of great growth; a proof that corn can be raised in this valley in large quantities, and to a large profit; twelve acres of oats produced forty-five bushels to the acre. Of fruit trees, he has two hundred and fifty peach, one hundred apple; five hundred grape vines. Mr. Coombe has just returned from the Atlantic states, with two valuable full blood stallions, one a "Glencoe" blood, three years old, the other a "Boston," four years. They show thorough breeding, and will, by another season, be in a condition to take premiums and sweepstakes. Introducing into this state thorough bred stock, is a laudable enterprise, and every importer of such stock should not only receive the hearty support of Californians, but a gold medal from the state.

From Mr. Coombe's we passed several large and highly cultivated farms, all handsomely fenced in, to Mr. J. W. Osborn's well known "Oak Knoll Farm." This farm contains one thousand two hundred acres of land, seven hundred inclosed with a handsome and durable fence; four hundred and fifty acres in wheat, fifty in corn, ninety in orchard; eighteen thousand fruit trees, most of them in full bearing; six thousand grape vines, thirty varieties; substitutes frequent cultivation for irrigation, although abundance of water is at hand, conveyed by aqueduct, one and a quarter miles in length, from the mountain springs. Has a large vegetable garden, an excellent dairy, large and convenient stables, pig stys, hen coops, wagon sheds, blacksmith and carpenter shops, and numerous other convenient out-houses. The grounds are interspersed with umbrageous oaks, and an avenue, two miles long, bordered with locust, walnut and other ornamental trees. The dwelling, just finished, is a

unique specimen of architecture; a compound of Chinese, Japanese, Italian, and other styles more modern. It is an odd residence, and very pretty; surrounded by hedges, clumps of trees, evergreens and shrubbery. This residence is approached, from the road, by three wide avenues, half a mile long, bordered by ornamental shade trees. The following is a list of farm utensils: ten plows, ten harrows, seven cultivators, one drill, four sub-soil plows, four gang plows, two reapers, one thrasher, one farm mill, one barley mill, two horse rakes, two rollers. Stock—eleven span work horses, one hundred mules and colts, fifty horned cattle. Help—twenty-two men. Soil, mostly light loam, well mixed with fine sand and gravel.

Mr. G. C. Yount lives ten miles from Napa City, near the foot hills, on one of the most lovely spots in the state. Mr. Yount is an old pioneer, twenty-five years a resident of this valley, and a much longer time in the state—a fine specimen of a perfect gentleman.

His farm comprises thirteen thousand acres, nine hundred inclosed and under cultivation; seven hundred acres in wheat, averaging thirty bushels to the acre; one hundred in grass. Fifty acres has been cultivated to wheat, twenty-two years, and produces from twenty-five to fifty bushels to the acre; needs no fertilizing but deep plowing. The first seven years the ground was but just scratched over with a Spanish plow. The soil is deep, rich loam, intermixed with sand and gravel. In the fruit garden are nine thousand grape vines, three hundred peach trees; in nursery, two hundred and fifty apple trees—measured a "Gloria Mundi" apple, twelve and a half inches in circumference, and two months yet to mature—three hundred and seventy-five trees of pear, plum, cherry and apricot. Strawberries, gooseberries and currants bearing unusually well. Measured a rose bush, nine inches at base, two years old, spreading its lateral branches hundreds of feet over the house. Saw two hop vines, set out early this spring, uncommonly full of flowers. Hops, this season, have been fully tested in several sections of the state, giving universal satisfaction as to the adaptability of our soil and climate for their perfect culture. Whoever cultivates a hop plantation will soon realize a fortune. Mr. Yount has a large and superior flour mill; two years since, it drew the first premium. The flour is unsurpassed in the state, for its good qualities, as hundreds of boarders at the White Sulphur Springs, near by, can fully attest; brings from fifty cents to one dollar per barrel more than any other brand. The cogs upon a large circular wheel, upon which several iron cog wheels work, are made of the true live oak. Upon close examination, (after two years constant use,) it cannot be observed that they are any more worn than the iron ones. This oak, when seasoned, will turn the edge of tools, and is much harder than the same species found in the southern states.

Three miles from Mr. Yount's we came to the stock farm of Col. J. R. Childs, containing one thousand acres, eight hundred and fifty-two under fence; beautifully situated, with a gentle slope from the foot-hills to the middle of the valley, and well watered by springs of the mountains. Col. Childs has quite a number of full blood Durham cows and

calves—a Durham bull, worth two thousand dollars, a beautiful animal; also, Southdown and Saxony sheep, full blood—one hundred horses—a fine blooded stallion. He has also a fine mountain farm, containing ten leagues—soil, rich loam, fine sand and gravel.

Three miles from Col. Childs' are the celebrated White Sulphur Springs, where we stopped for the night. Messrs. Staff and Brewster are the proprietors of these springs. The hotel cost one hundred and thirty-five thousand dollars; it is the best in the country, and better is seldom found in the older states. The house is two hundred and forty feet long, by sixty feet in width, containing one hundred and thirty-five rooms, all very spacious and handsomely furnished. A handsome flower garden, walks, avenues, bowling and billiard saloons, stable, &c., all in keeping with the hotel, on a liberal scale. The water in these springs is quite warm, and being strongly impregnated with sulphur, is quite medical. Hundreds resort to these springs monthly for recreation and medical aid.

Twenty-five miles from Napa City, Mr. R. T. Tucker has one hundred and sixty acres of land—forty acres under cultivation—six acres in orchard—containing seven hundred fruit trees and grape vines, all of very fine growth. The soil, in this section of the valley, is a light loam, mixed with coarse gravel, producing large crops of the cereals, and all varieties of fruit, without much irrigation. The valley here is a mile wide—the mountains, three hundred to two thousand feet high.

Leaving Mr. Tucker's, called on Mr. F. Kellogg, who has a fine orchard, as near as we could judge, and received a valuable premium from the State Agricultural Society, last year; but, exercising a good and charitable disposition, it being a very hot day, he allowed us to pass on to his kind neighbor, Mr. Wm. Nash, who has a very fine, thrifty orchard, cultivated with care, neatness and skill. His apple trees, four years old, all in full bearing, and quite large—one, six years old, measuring two and a half feet in circumference, and twenty feet high. Waters twice a year, from a tank which holds ten thousand gallons, filled by a pipe running from a spring in the mountains near by. We noticed two very pretty ornamental shade trees, near the stable, two hundred feet high and thirty feet in circumference—species, red-wood. Immediately about his house, and in the hills near by, we counted twenty varieties of forest trees, the largest native collection, probably, in the state; following is the list: laurel, chestnut, oak, red-wood, fir, pitch pine, Virginia dog-wood, alder, madrone, hickory, oak, tar-pentine pine, post oak, black oak, white oak, ash, willow, silbert, hazel, manzanita, buck-eye, maple, and the true live oak, (*quercus virens*), which grows there to great perfection.

Mr. W. Kilburn, thirty miles from Napa, has a large and thrifty orchard of apple, pear, peach, plum and cherry trees, four years old, of choice and rare varieties. His peaches and apricots were well tested, and pronounced equal, if not better, than found elsewhere; also, a good and generous lunch, politely given us by Mrs. Kilburn and her fair daughter, which we devoured with "mucho gusto," our digestion being assisted by a hearty laugh, in recollection of the poor, half starved committee, who visited this section the year previous.

Leaving Mr. Kilburn's, we drove to the Hot Springs, two miles, for dinner—dined on vegetables cooked in one of the hot springs—eggs boiled in eight minutes, and tea made in three. The temperature of these springs is near boiling—they cover a space of several acres. The water is slightly impregnated with alkali—has a wonderful faculty of cleaning the skin. The baths are much sought for. Although the water is too hot to endure for a moment, yet cattle come from a distance to drink it; and some varieties of flowers and grass, that grow on the hill sides, near by, where their roots are not accustomed to such a bottom heat, grow and bloom to perfection—an odd freak. Twenty-five miles from these springs, high up in the mountains, are the wonderful Geysers; a place much resorted to, of late, for the wild, romantic and volcanic scenery. Not far distant are the Borax Lakes, the largest about two hundred acres in extent. These lakes, recently discovered, are very valuable. The waters are strongly impregnated with borax, and are supposed to contain quantities sufficient to supply the world. From this lake, a mile north, is the noted Sulphur Bank, covering over thirty acres, and thirty feet thick, sufficiently pure for all purposes. The discovery of these two commercial articles will be another addition to the long list of California productions for exportation. Borax and brimstone are important articles in commerce and many of the arts. The annual exportation of brimstone to the Atlantic states, from the Mediterranean, amounts to twenty million pounds, worth one hundred and seventy thousand dollars—and eighty thousand pounds borax, worth one hundred and fifty-four thousand dollars. Cochineal, similar to that found in Mexico and Brazil, has been recently found in large quantities; also, immense beds of volcanic glass (obsidian,) are found in the vicinity of Clear Lake, and other beds in Napa County; it is now being experimented upon, and if it proves good for the manufacturing of glass, the inexhaustible quantities will be another invaluable product of our beautiful and productive California.

Mr. Smith being obliged to return home from Napa City, Mr. Yount, Col. Childs and Mr. J. C. Davis, old California pioneers, and well known throughout the state; very kindly volunteered to accompany us through Sonoma, Santa Rosa and Petaluma valleys. On the morning of the 22d, we left Napa City for Sonoma, crossing the dividing ridge which separates Napa and Sonoma valleys, twelve miles. Sonoma is an old Mission, located near the centre of this valley in 1824. The buildings are principally adobe. Architecture, like all Spanish cities and towns, Moorish style. Visited Col. Haraszthy's vineyard and orchard, recently purchased of Messrs. Reese & Jenkins, one and a half miles from Sonoma. This beautiful location, partly in the foot hills, overlooking the valley, is admirably adapted to the cultivation of the grape. The deep, rich, loamy soil, mixed with sand and gravel, will soon render this an important point for wine making and grape culture.

The place contains eight hundred and eighty acres of land, forty acres in vineyard and orchard, and can be irrigated abundantly from natural springs. In the vineyard are two thousand old grape vines, planted in 1824; eight thousand two years old; eighty thousand cut-

tings, put out in February last, over five thousand bearing; two hundred and fifty apple trees; fifty fig, of uncommon size, bearing nine months in the year. Mr. Harashty sets six hundred and eighty vines to the acre, has two hundred and eighty varieties of grapes, the largest collection, probably, in the state; will make ten thousand gallons of wine this season; is importing, from Europe, a variety of grape cuttings suited to mountain culture. In rear of his cottage is a hill, about eight hundred feet high, which he intends to cover with grape vines.

Mr. H. Clayton, who resides one mile from Sonoma, has a lovely spot for a residence; a large, fine garden and orchard; two acres in buckwheat, eight acres sweet corn, all looking extraordinarily well, giving another evidence of the adaptability of the soil and climate of this valley to produce large crops.

He has eight hundred apple trees, seven hundred peach, a good variety of pear, plum, grape, &c.; observed one hundred apple trees, set out in June, and but little irrigation used, all looking very healthy, and growing fast.

Counted over fifty apple trees that were completely girdled, two years ago, by rabbits. Mr. C. immediately applied tar to the trees, from twelve to sixteen inches from the ground, saved all the trees and prevented all further depredations from rabbits. That part of the tree tarred has increased, in size, one inch more than the part immediately above the tar.

Soil, light loam, with a slight mixture of gravel and sand—no irrigation.

Two miles from Sonoma, Mr. Griffith has a fruit orchard of thirty-five acres, containing three hundred apple trees, twenty-five varieties; seventy peach, forty pear, thirty varieties; also, plum, cherry, and two thousand five hundred trees in nursery. Peach and apple trees all thrifty and very full of fruit.

No irrigation—uses the cultivator often. Soil, deep, rich loam.

Mr. Albert Lyon, near Sonoma, has a fine orchard, of one thousand fruit trees, consisting of apple, peach, plum, cherry and pear, all of thrifty growth, producing great quantities of fruit. Trees pruned to a fine standard—grounds well cultivated, and kept very neat—everything in his orchard indicates an experienced and skillful cultivator.

Visited, also, Mr. Moody's fine garden, which contains several thousands of fruit trees, of all varieties, all looking thrifty.

One mile from Sonoma is the beautiful gothic residence of Gen. Valjeo, an old pioneer in agriculture. The beautifully arranged and highly improved gardens and grounds, the healthy and luxuriant growth of trees, shrubbery and flowers, fully attest the General's skill and taste in horticulture and agriculture. He has one hundred and fifty acres inclosed and under cultivation; one thousand five hundred apple trees, one thousand peach, one hundred plum, one hundred and fifty pear. The olive, orange, fig, pomegranate, four years old, were of large growth, looking as thrifty as in their native climate and soil; ten thousand grape vines, one year old, three thousand from fifteen to twenty-five years old, all in full bearing. Partly surrounding his house and garden is a beautiful

rose hedge, four feet high and four hundred feet long, trellised over an iron fence; when in full bloom it exhibits a magnificent appearance. A wide avenue, half a mile long, approaches his residence from the road, bordered with ornamental shade trees. Soil, black loam and alluvial.

From Sonoma we continued our journey to the romantic and beautiful location, "Agua Caliente," the residence of Mr. McPherson Hill, situated in the foot hills overlooking this valley. Mr. Hill has one thousand acres of land, one hundred and fifty acres inclosed; eleven hundred fruit trees, of all varieties, most of them in full bearing; apple and pear trees, with fruits of rare varieties, looking better than any we had before seen in the state. The numerous springs in the hills near the residence, produce abundance of water for irrigation and stock, but, like a majority of fruit growers in this state, he prefers the plow and cultivator to irrigation; a mistake, most undoubtedly. We have noticed that in various sections where orchards were well irrigated, they produced much better fruit, larger in size, more luscious, and in greater quantities, although there are some locations where the sub-soil is always moist and needs no irrigation. Mr. Hill has a fine farm for grain and stock, as the large fields of wheat and barley, averaging thirty-five bushels to the acre, and the rolling hills dotted with herds of fat horses and cattle, and flocks of Saxony and Southdown sheep, fully attest. The soil in this section of the valley is a deep, rich, black loam, well mixed with sand and gravel.

Called on Mr. Hood, who lives twelve miles from Sonoma, on the road to Santa Rosa, to see his celebrated stallion "Lawyer," which well paid us for our trouble. Lawyer was purchased four years since, in England, by Mr. Hood, and brought to this country at a large expense; is the only imported, thorough-blood stallion in the state; is a splendid animal, of great speed and bottom. Saw, in the corral, about thirty of his colts, some of them half-breeds, destined yet to make themselves known, like their sire.

From Mr. Hood's, we proceeded ten miles to the lovely valley of Santa Rosa, a perfect garden spot; grains, of all varieties; fruits, flowers, trees, and shrubbery, growing with a tropical luxuriance. This little valley is sixteen miles long, by eight in width, nearly surrounded by mountains, which are covered from base to top with a large variety of forest trees and evergreen shrubbery. The climate and soil are unsurpassed. The soil is a dark, rich loam, intermixed with fine sand and alluvial deposits. Santa Rosa is situated on the river of the same name; is a handsome and well laid out town; contains about eight hundred inhabitants; is the county seat of Sonoma County.

Some fifteen miles north is the Russian River. The valleys on this river are very productive. Corn and potatoes grow to great perfection, and in great quantities. The soil is a deep, rich loam, well intermixed with black sand. Bodega has been, since 1860, celebrated for its potatoes, producing twelve tons to the acre. Beets, carrots, and turnips, grow to unheard-of dimensions. On this river is found, in large quantities, the true Scotch hawthorn; a shrub much used in England and Scotland for hedges.

From Santa Rosa we continued our route through Petaluma Valley

to Petaluma City, fifteen miles.. This is one of the most thrifty and enterprising towns, at present, in this state; containing about eight hundred inhabitants; situated at the head of navigation on Petaluma Creek, and at the foot of the rich grazing valleys of Petaluma.

Santa Rosa and the Russian River receive all the immense products on route for San Francisco market. In the vicinity of Petaluma are more than one hundred and thirty large dairies, each having from fifty to two hundred milch cows. The sales this year, of butter, cheese, and poultry, are rising six hundred thousand dollars. The products of Sonoma County, which includes Petaluma, Sonoma, Santa Rosa, and Russian River valleys, taken from the list of the county assessor, Mr. Lee, are—stock: American horses, one thousand six hundred and seventy-two; California horses, six thousand two hundred and ninety-three; mules, five hundred and seventy-six; jacks, six; work cattle, two thousand eight hundred and seventy-nine; cows, fifteen thousand five hundred and thirty-six; calves, nine thousand two hundred; young American stock, nineteen thousand three hundred; California cattle, ten thousand six hundred and ninety-three; sheep, twenty thousand seven hundred and seventy-one; hogs, sixteen thousand three hundred; goats, one hundred and twenty-four; wheat, three thousand six hundred and eighty-seven acres, averaging fifteen bushels to the acre; oats, eight thousand acres, average yield, twenty-five bushels; barley, four thousand six hundred and eighty-nine acres, twenty-five bushels to the acre; corn, one thousand four hundred and forty-five acres, total yield, forty-three thousand three hundred and fifty bushels; potatoes, three thousand six hundred and fifteen acres, total yield, three hundred thousand and forty-five bushels; beans, peas, buckwheat, four thousand acres; fruit trees, of all kinds, sixty-seven thousand two hundred and fifty-three; grape vines, of all kinds, one hundred and seventy six thousand five hundred and eight.

Napa, Sonoma, Santa Rosa, Petaluma, and the Russian River valleys, just visited, are well worthy special notice, being the most lovely and picturesque spots in the state; climate, too, being even; mean temperature about 70°, rendered humid by the sea breezes, which are partly broken by the coast range of mountains. These valleys run parallel to each other, and are separated by spurs of the coast range, which are from one hundred to one thousand feet in height, covered with a luxuriant growth of red-wood, and several varieties of oaks, pines, maples, and other forest trees, and a great variety of evergreen shrubbery, and is one continued stretch of beautiful, romantic, mountain and valley scenery, unsurpassed. The soil in these valleys varies; mostly loam and clayey. Large crops of wheat and barley are produced, averaging thirty-five bushels to the acre. Other sections, deep, rich loam, intermixed with gravel and fine sand, and replenished yearly by the washings from the mountains. All fruit products, especially the grape, in all varieties, grow and mature on the plains or hills to great perfection. These valleys will, in a few years, become the great vintage ground of the north, with their wine presses dotting the plains, and the vintage time will become an important yearly epoch.

Having finished the examination of all the noted farms, orchards, etc., in these delightful valleys, we left on the 29th for Stockton, one hundred and fifty miles, having traveled over three hundred miles, through one of the most romantic and fertile sections of the state, surpassed only by the hospitality, generosity, and intelligence of the inhabitants. No time nor pains were spared, on the part of those we visited, to give us all the information we required, and we were most kindly and generously cared for; for all which, we here tender our grateful acknowledgments.

There are many more farms in our state as good and extensive as those we have visited, and hundreds that will compare well with the best in the older states. Our climate and soil will not only produce all the cereals, grasses, vegetables of mammoth growth and superior quality, and all the northern fruits to perfection, but the most delicate fruits, trees, and shrubs of the tropics. Our even, healthy and delicious climate is unsurpassed even by the world renowned Italian, a climate that at once gives life and strength to the newly arrived invalid, and renovates broken-down constitutions from other climes. In short, what other country presents so many inducements to the man of the northern states, who is six months in the year chilled with frost, and four months living in snow-banks; or the man of the south, who once a year flees from the pestilential heats; or the western man, whose first god is his rifle, as a protector from the Indian? To establish the fact that this is the best country to live and die in, seventy-five in one hundred who leave this state, return again, fully satisfied that California is the country.

On the 29th of July, the committee again visited Sacramento, the "City of Gardens." To note all we saw there, truly worthy of admiration, would make our report unreasonably long. The committee, therefore, concluded to make record of only a few, as fair samples of the whole.

The garden and nursery of Rev. O. C. Wheeler, for its high cultivation, great amount and variety of fruit and ornamental trees and shrubbery, grown on a space of two and a half acres, deserves much praise, and is well worthy of imitation, and a long drive to see. This finely arranged and highly cultivated garden contains eleven thousand apple trees, three thousand peach trees, six thousand pear trees, three hundred cherry trees, five hundred plum trees, two hundred grape vines, two hundred apricots, five hundred quince trees, one and two years old. Also, a large amount of strawberries, raspberries, gooseberries and turrants. In the department of ornamental trees, there are six thousand pines, of twenty-five varieties; three thousand five hundred elms, three hundred maples, and a large variety of ornamental shrubbery; and an Osage orange hedge, twelve hundred feet long, which surrounds the whole place.

Dr. Brown's garden, though not so large as that of Mr. Wheeler's, is equally well cultivated, and contains a great number and variety of fruit and ornamental trees, shrubbery, plants and flowers, all of fine and healthy growth.

The soil in this city and vicinity is a rich, deep, sandy loam, peculiarly adapted to a sure and rapid growth of all varieties of trees, shrubbery, and vegetable productions.

The thousands of cottonwoods that border and shade miles of streets, planted but four or five years since, from thirty to forty feet in height, give the city, at a distance, a forest-like appearance, and show the good taste and energy of its citizens.

Mr. C. W. Reed, in Washington, opposite Sacramento, has one hundred acres in farm; thirty acres in orchard and nursery. The trees and seedlings, particularly the plum, pear, and cherry, looking equal to any we had visited. He has twenty thousand apple seedlings, twelve thousand grafted; five thousand peach seedlings; twenty-five thousand budded; two thousand cherry, one and two years old; one thousand plum, fifteen varieties; five thousand cherry, in bud; four thousand pear, one and two years old, from bud; eight thousand budded this year; fifty varieties; one thousand apricot, five varieties.

Soil, near the river, a light, sandy loam; back from the river, a dark, mellow loam, which suits the trees much the best. Mr. R. does not irrigate, but plows twice a month.

From Mr. Reed's, we went down the Sacramento two miles, to the farm of Dr. Curtis. This farm contains six hundred and forty acres; sixteen acres in corn, two acres in peanuts, sixteen in melons, two in cabbage, eight in barley, and four in pumpkins. The remarkable growth of all vegetation on this farm is accounted for by its being cultivated on reclaimed overflowed tule land, the soil being deep, rich, alluvial; a complete compost. Dr. C. has spent much time and money in reclaiming this forty or fifty acres, which he cultivates, but it proves a good investment, and, what is gratifying, it conclusively establishes the theory that he has been advocating for several years, in the legislature and elsewhere, that the tule lands are the richest in the state and can be easily reclaimed. The Dr. was an experienced cultivator of the peanut in the southern states, and, from the two years' experience in this state, he is convinced that they can be raised to great perfection, and in large quantities, in all sections of the state where there is a sandy loam, or mellow soil.

Returning from Sacramento, the committee made a tour in San Joaquin County. This county is fast improving, and is, undoubtedly, one of the best grazing and agricultural districts in California. The soil in most parts is a deep, rich, black loam; in other sections, a blue clay, well intermingled with fine sand and alluvium, perfectly adapted to all kinds of grains, grasses and fruits, in great abundance and perfection. Thousands of acres, located on the river bottoms, produce yearly immense quantities of wheat and barley, averaging thirty-five to forty bushels to the acre. It is acknowledged, by thousands who have lived in all parts of the world, that for health, evenness of temperature (the average being 70°,) and salubrity, the climate is not surpassed by any on the globe. The scenery, too, is enchanting; the broad plains, stretching from the foot hills of the coast range to the Sierra Nevada, fifty miles, are variegated with groves of umbrageous oaks, luxuriant fields of grain, and fine farms. Bounded on the west by the high, rolling hills of the coast range, which break and subdue the chilly winds of the Pacific, and on the east by the Sierras, which lift their snow-capped peaks to the skies,

this beautiful and extensive valley presents a scene of contentment to the weary immigrant, seeking a home, which all language fails to describe.

We are indebted to Mr. Strout, county assessor, for the following valuable statistics of the products and resources of San Joaquin County, compiled from his books for 1857: wheat, twelve thousand seven hundred and thirteen acres, three hundred and fifty-four thousand two hundred and sixty bushels; barley, thirty-three thousand eight hundred and twenty-seven acres, eight hundred and forty-five thousand six hundred and seventy-five bushels; oats, one thousand eight hundred acres, fifty-six thousand four hundred and sixty bushels; rye, one hundred acres, three thousand bushels; corn, two hundred and three acres, ten thousand one hundred and fifty bushels; buckwheat, sixty-one acres, one thousand five hundred and twenty-five bushels; peas, fifty acres, one thousand five hundred bushels; beans, thirty-two acres, one thousand six hundred bushels; potatoes, two hundred and ninety-one acres, eighty-seven thousand three hundred bushels; onions, one hundred acres, thirty thousand bushels; hay, eleven thousand six hundred and seventy-four acres, twenty-four thousand tons. Fruit trees and vines—apple trees, thirteen thousand six hundred and thirty; peach trees, seven thousand four hundred and twenty; pear, one thousand three hundred and fifty; plum, six hundred and fifty; cherry, four hundred and seventy-three; nectarine, two hundred; quince, eight hundred and ninety-two; apricot, five hundred and twenty-four; fig, three hundred and ninety-six; olive, seventy-nine; pomégranate, three thousand one hundred and sixty-two; pecan, forty-one; almond, sixty; walnut, sixty-three; grape vines, twenty-eight thousand six hundred and forty; raspberry, three hundred and forty-nine; strawberry, seventeen thousand five hundred and sixty-four; gooseberry, two thousand four hundred and sixty-seven. Live stock—horses, American, one thousand eight hundred and thirty-eight; Spanish, (tame,) one thousand six hundred and forty; Spanish, (wild,) one thousand two hundred and twenty; total, horses, four thousand six hundred and ninety-eight; mules, two thousand one hundred and twenty; asses, forty-two; cows, five thousand and twenty-six; calves, four thousand one hundred and fifty-four; stock cattle, eleven thousand six hundred and forty; beef cattle, three thousand six hundred and twenty-nine; oxen, one thousand five hundred and forty-eight; total number of cattle, twenty-five thousand nine hundred and ninety-seven; sheep, fifteen thousand and thirty-seven; goats, five thousand one hundred and fifty-four; hogs, nine thousand two hundred and seventy-eight; chickens, thirteen thousand one hundred and ninety-two; turkeys, three thousand nine hundred and eighty-four; ducks, six hundred and fifty; geese, two hundred and thirty-one. There are seven grist mills, five propelled by steam and two by water, with a run of nineteen stones, which are valued at two hundred and eight thousand dollars, and one saw mill, within the county; together with six ferries and three toll bridges, valued at thirty thousand dollars. Of the ninety-eight thousand three hundred and ninety-four acres of land inclosed, sixty-four thousand four hundred and twenty acres is in a state of cultivation.

The city of Stockton is situated on a slough at the head of steam navigation on the San Joaquin River, is the seat of justice of San Joaquin County, and contains about six thousand inhabitants. It is the commercial depot for a district of five thousand square miles of auriferous soil and rock, known as the southern mines, furnishing steady and lasting employment for hundreds of thousands of miners. It is also located in the midst of one of the richest and most fertile valleys in the state, of vast extent and resource, all which combine to promise for Stockton a prominent and prosperous future.

In the vicinity of Stockton are many large and well cultivated farms. Mr. Overheiser, three miles from town, has a beautiful and well cultivated farm; four hundred and fifty acres under fine fence, post and rail, three hundred acres in wheat, average thirty bushels to the acre, one hundred acres of barley, thirty-five bushels to the acre, a fine cottage, granary, large barn, and all the appliances necessary to carry on a well conducted farm. The soil is a light loam, deep and rich. Plows deep, and sows grain early; hence, his extra crop.

Mr. E. H. Comstock, eight miles from Stockton, has a farm of twenty-two hundred acres, fenced as follows: six miles of ditch, three and a half feet deep by three wide, with posts and rails above; two miles, posts and seven rails; one mile, posts and three rails; four and a half miles, posts with four rails. Besides the fence inclosing the whole farm, there is sufficient to divide it into five different fields. The orchard contains a general variety of fruit trees, numbering over three hundred, and is inclosed by a fence, six boards high. The farming utensils consist in part of three gang plows, (three plows each,) two large square harrows, seven triangular harrows, four large cultivators, valued at four hundred dollars each, four common cultivators, three reapers, two horse rakes, one thresher; twenty horses, and fourteen oxen, with all necessary harness, yokes, chains, etc.; wind pumps for water, and stabling sufficient for all the teams; blacksmith and wagon-maker's shops and tools, etc., which, with the farm-house, barn, hen-house, corrals, etc., combine to make one of the most complete and convenient farming establishments in the state.

Mr. Comstock plows about sixteen hundred acres, two hundred of which he this year summer-fallows, two hundred acres he mows for hay. One hundred acres has just yielded its third crop of barley, since plowing or sowing. Two hundred acres, sowed very late, has this year yielded three thousand bushels of barley. One hundred acres, sowed last winter to wheat, and eight hundred acres of volunteer, nothing done to it but to "bush it in," made an aggregate crop of fourteen thousand bushels of clear wheat, and twenty-five hundred bushels of screenings. The hay crop this year amounts to one hundred and seventy tons. It will be seen that Mr. Comstock's business is grain growing, and yet he has some very fine stock, among which may be named hundreds of horses, neat cattle and hogs. As a whole, this farm commends itself to the committee as worthy of especial notice.

Mr. V. M. Peyton's farm, situated on the Calaveras River, ten miles from Stockton, contains six hundred and fifty acres, well fenced with

post and rail; three hundred and fifty acres cultivated in wheat, one hundred acres in barley. Uses a large gang plow, drawn by five yoke of cattle, plows deep and harrows both ways. Average yield of wheat, from twenty-five to thirty bushels to the acre; barley, from thirty to forty bushels. This fine farm is well supplied with the best farming implements, and cultivated with perfect neatness, being freed from all stumps, roots and rubbish, looking like a well kept park. This farm yields a net profit this year of several thousand dollars, fully proving its owner to be a good agriculturist. Soil, a rich, mellow loam, which is the character of most of the soil on the Calaveras, and is perfectly adapted to the culture of fruits, grains and vegetables, of all varieties.

Mrs. Rhodes, five miles from Stockton, has a well cultivated farm of two hundred acres, under post and rail fence; one hundred and fifty acres in wheat, producing a large crop; a pleasant residence, large barn, carriage house, fruit, vegetable and flower garden, and all necessary implements for carrying on a well regulated and cultivated farm. This beautiful location was selected by Mrs. R. some four years since, and under her supervision and perseverance there has risen from the wild plains a highly cultivated farm and beautiful home. The hundreds of lazy, indolent California male farmers, who are constantly crying hard times, no money, poor country, &c., would profit by taking this *lady's* farm for an example.

Only a few farms in this county are reported; hundreds of others could be named, equally as good, and many much larger.

Mr. G. N. Cannon, near the Asylum, has a lot three hundred feet square, well tilled and under good cultivation. His garden contains peach, apple, plum, cherry, pear, apricot, almond, pomegranate and figs; in all, seventy-three trees; eighty-four seedlings of several varieties. This garden is three years old, and the trees are as forward in growth as those grown in the Atlantic States would be in four years.

Opposite Mr. Cannon's, Mrs. Lilly & Son have a fine garden of two and a half acres, judiciously tilled by deep trenching, manuring and constant irrigation, which is the only true mode with the stiff, adobe, clayey soil; which the large and thrifty growth in this garden fully attests. This garden contains peach, apple, plum, almond, cherry, pear, fig, nectarine, apricot trees; in all, two thousand nine hundred and twenty-three. Currants, gooseberries, and all varieties of vegetables, all looking remarkably well.

Mr. C. T. Meader has a handsome residence and a well laid out garden, under good cultivation. Fruit trees, of several well approved varieties, two and three years old, all in very full bearing; the trees of uncommon growth. The soil a stiff clay, a perfect adobe; but, by deep digging, a little manure, and abundance of water, has produced trees of great growth and delicious fruits. The trees equal in size those grown in the old states twice their age.

Dr. E. S. Holden has a fine residence and has cultivated his grounds with much expense and care, by deep digging and free use of manure, two to three years old, consisting of ashes, sand and tulle muck. He has peach trees, bearing large and luscious fruit, eighteen months from

bud ; apple, pear, plum, cherry, quince, grape vines trellised over two hundred feet of arbors, strawberries, gooseberries, raspberries, currants, all of great and rapid growth; walks and avenues, bordered by acacias, China trees, alanthus, elm, walnut ; tobacco tree, growing seventeen feet in six months; black and honey locust, catalpas, hedges, etc. Also, many tropical plants and shrubs.

Dr. R. K. Reid, adjoining the Insane Asylum, has a fine house, and a fruit and floral garden of unusual taste and elegance. He has peach, pear, plum, apricot and other fruit trees and vines in rich profusion, and all harmoniously mingled with climbing and bush roses, passiflora, jessamine, eplantine and clematis. In his grounds he has a plant of native California tobacco, only two years old, now standing more than twenty feet high. He makes free use of water, supplied by means of a wind pump.

On the first of August the committee visited the grounds of Judge Craner. Mr. Craner has about six hundred trees, two hundred of which are peaches in full bearing and containing some very fine fruit, amongst which were some very fine seedlings ; he has, also, the usual varieties of plum, pear, apple, etc. He has some very heavy bearing grape vines.

Same day visited the garden of Rev. Mr. Kroh. His lot, of fifty by one hundred feet, contains two hundred and forty-five grape vines, of different ages, sixty-nine of which are in full bearing. He has twenty-seven apple trees, six of which are in bearing, eleven plum trees, seventy-nine peach trees, of which fifteen are in bearing, seventy-three neotarines, two bearing, four pear trees, thirty-seven apricots, three bearing ; also, cherry, quince, etc. Whole number of trees and vines, one thousand one hundred and twenty-one, besides considerable shrubbery and vegetables.

The above will show what a large amount our soil will bear, if properly cultivated.

We also visited the house and grounds of B. W. Bourse. Mr. Bourse has a great variety of roses, and some of the finest we have seen. They have been selected with great care, and show a healthy growth. Also, fruit trees in full bearing, of the usual varieties ; fine geraniums and other plants. We saw a number of the Otaheitean mulberry, growing finely ; also, the largest and finest oleander we have ever seen. Mr. B. brought it from Mexico some six years since, and it has grown to an enormous size, and sheds its fragrance all over his garden. We saw several specimens of the Mexican cactus, which were brought from Mexico by Mr. B.

On the northern limit of the city, Wm. Green has two hundred vines, full of grapes, and very large clusters ; also, three hundred vines in nursery. He has seventy-five fruit trees ; his garden is on an Indian mound, the soil very fine, and his trees and vines show a very rapid growth. He irrigates by wind pump, and conducts the water in trenches.

We next visited the garden of Mr. John Petty. His soil is mostly from the tule swamp land, and his trees and flowers are grown very

rapidly. His grounds are laid out tastefully, and are taken good care of. His style of irrigation we consider to be the best for garden purposes of any in the city, if not the state. He raises the water into a tank, by means of wind pump, and distributes it through the garden by means of red-wood flume, under the earth, at each tree or bush. There are pieces of lead pipe extending from the flume, about two inches above the surface of the earth. These pipes are capped, and a small hole pierced in the top. On turning his faucet that lets the water into the flume, each pipe throws a jet about six feet in height, making a very pleasant sight, and acting on the trees and plants like a rain shower.

Mr. J. Keeler has a beautiful residence and home. His garden is tastefully laid out, and the only one in the city where the principle of deep trenching has been carried out—the only true system for the perfect preparation of the adobe soil. The stunted and sickly appearance of his fruit trees, caused by being planted too deep, some twelve or fifteen inches below their natural position, is sufficient proof of a bad system. Trees should not be set more than two inches below their first growth, particularly in cold, stiff, clayey soil.

Visited Mr. C. T. Meader, who has a fine residence, and a well tilled garden, containing apple, pear, peach, plum, cherry, and other kinds of fruit trees, all looking thrifty—the peach trees, three years old, in very full bearing, and fruit very large and fine flavored.

Also visited the gardens of Judge Brown, C. O. Burton, R. B. Parker, and James Mills, all exhibiting uncommon growth of vegetables, flowers, plants and trees.

Mr. Peyton has in his garden, in this city, a variety of fruit trees, of very large growth. We noticed one peach tree, four years old, over twenty feet high, round the boughs seventy feet, and bent to the ground with large and luscious fruit. This tree stands near a sink, and receives plenty of water, which is the cause of its large growth and extra quality of fruit.

Dr. Bateman has a garden one hundred and fifty feet square, well filled with rare varieties of fruit trees, flowers, shrubbery, and ornamental trees, all looking thrifty, and of a large growth. The Doctor is a Stockton pioneer in fruit growing, and is as skillful in producing fruits and flowers as in administering the healing art. Soil is a strong, stiff clay, but by frequent digging and irrigation has become light and very productive. He has thirty-five hundred black locust in nursery.

Mr. A. S. Gage has, in a lot three hundred feet square, besides house, barn and outbuildings, two hundred and forty apple, pear, plum, cherry, and almond trees, and fifty grape vines, all remarkably thrifty, produced by frequent digging and irrigation. His manner of planting, in holes three feet deep and six wide, the soil well mixed with old horse manure, and two quarts of blood from a slaughter house to each tree, is highly commendable.

H. M. Gage has in his garden one hundred and fifty-nine peach trees, fifty-one apple, cherry, plum and pear, five hundred and thirty-nine grape vines, all in bearing, from two to four years old.

On the 6th of August the committee visited San Francisco, and ex-

amined many fine specimens of agriculture and horticulture, among which was the extensive and highly cultivated garden of W. C. Walker, who has spared neither pains nor expense in producing, in large quantities, for the fast increasing demand, all the rare varieties of flowers, shrubbery and ornamental trees. The conservatory, one hundred feet long, contains a vast number of choice exotic and native plants. The dahlias, of one hundred varieties, cultivated in the sandy loam and in a shady position, far excelled any noticed in this country or elsewhere. The tropical trees and shrubbery, pine, spruce, cedar, and other varieties of evergreens, all thriving as well as in their native soil and climate. Every department of this extensive establishment evinces a skillful, scientific horticulturist and florist.

Opposite Mr. Walker's, or the Golden Gate Nursery, is the United States Nursery of Mr. O'Donnell, who is one of the most industrious and skillful gardeners and florists in the state, as the large and thrifty growth of the countless varieties of ornamental trees, shrubbery, roses, and flowers, well arranged grounds, and fine cultivation, fully attest.

We noticed, with much pleasure, the *orenothus*, trimmed into many beautiful shapes. This beautiful evergreen shrub grows in great abundance in the sand-hills about San Francisco, and for ornamental hedges is unsurpassed.

A short drive brought us to the celebrated "Garden of Roses," of Mr. Henry A. Sonntag, at the Mission Dolores. Mr. S. is the largest cultivator of the rose, in this country. His garden is under fine cultivation, and contains thousands of rose bushes, of over one hundred choice and rare varieties, and is probably the largest and finest collection of roses in the state. Mr. S. is constantly importing rare and choice varieties from Europe and the states. He considers this country, both in soil and climate, far superior to the Atlantic states, (where he has had a long experience,) for the cultivation of roses, flowers, and shrubbery of all kinds.

Near Mr. Sonntag's is the large and handsomely arranged garden of Mr. John Center. This beautiful garden contains eighteen acres, and is well filled with choice fruit trees, flowers, and ornamental plants. The large and beautiful conservatory, well filled with a great variety of flowers, plants, and shrubbery, and a fine fountain in the centre, is well worth a long ride to see. Has quite a number of peach trees trained as espaliers, which cover a large surface, look very thrifty, and are prolific bearers.

On the 15th of August the committee visited Mokelumne Hill, fifty miles from Stockton. This is one of the richest mining districts in the state. Millions have been expended in ditches, tunnels, quartz machinery, etc. This place has a population of two thousand, and has the appearance of industry, enterprise and wealth. Many of its residences, gardens, and orchards, are very fine. A. P. Dudley has a spacious and costly residence; in his tasty and well laid out garden are found growing, though high up in the mountains, rare flowers, roses, tropical shrubbery, and trees in great luxuriance.

The orchards and gardens of Dr. Soher, H. M. Sturgess, Judge

Thomas, and Bryant, and many others, have peach, apple, pear, plum, and other varieties of fruit trees, and grape vines, in full bearing at two years old, and growing with great rapidity. Corn, of several varieties, hops, vegetables of all kinds, thrive in the mountains to the entire satisfaction of the producers, always being sure of large and profitable crops. The warm, congenial climate, abundance of water, for irrigation, from the thousands of mountain springs, the deep, rich, alluvial soil in the valleys, and the red, gravelly loam on the hills, produce fruit trees and vegetables to great perfection. The enterprising and handsome mountain towns, Sonora, Columbia, Murphy's, San Andres, Springfield, and many others, though not visited, are equally praiseworthy with Mokelumne Hill.

If the mountains, (Sierra Nevada,) from the extreme north to the south, or the length of the state, eight hundred miles, are thousands of rich, fertile valleys, watered by never failing springs, which gush from the mountains and hill sides, quietly and romantically situated, waiting only the husbandman and plow, to produce every variety of northern and tropical grains, grasses, and vegetables, in quality and quantity to suit the most exacting cultivator.

The agriculturist and horticulturist from sterile New England, who lives one-third of the year in a snow-bank, and the balance in hard toil to rid his fields of trees, stumps, and stones, here has nothing to do but to turn the furrow, plant his seed, and, in due time, a sure and abundant crop follows. A climate, too, for evenness of temperature, health, and salubrity, unsurpassed. The adaptability of these valleys and hill sides, for fruit-growing, is just being discovered. The monstrous pears, apples, peaches, and plums, raised this season, surpass all others grown in the state. Figs and grapes grow and mature with all their native luxuriance and perfection. Cotton, hemp, tobacco, Chinese sugar cane—in short, every agricultural product reaches its highest perfection in these valleys, and, in a very few years they can, and undoubtedly will, produce vast quantities for exportation, and turn to other countries the present Mediterranean fleet of six hundred and forty-three vessels, which annually leave for the Atlantic ports, loaded with figs, lemons, limes, oranges, products of the vine, almonds, currants, and raisins, to the amount of seven and a quarter millions of dollars. Italy, and the countries bordering on the Mediterranean, annually produce over two hundred millions of dollars' worth of wool and fruit products; one hundred millions' worth are sent to foreign markets. California has a climate and soil very similar, and, with the perseverance and indomitable energy of her inhabitants, and the twelve millions of acres of arable lands, should also, in due time, freight to foreign markets her six hundred and forty-three vessels. The raising of sheep in the mountains has been perfectly tested. In no part of the world do they thrive better, and soon, wool will be exported in large quantities; importations of which, amounted, last year, to fifteen millions of pounds, valued at one million seven hundred thousand dollars.

The culture of the grape and the manufacture of wine, is rapidly becoming a large, important and profitable business. Germans, French,

and others, coming from wine-producing countries, who have had long and full experience in the culture of the grape, pronounce this the best section of the world for its growth and perfect maturity. There are now over three millions of grape vines in this State, increasing, by hundreds, of thousands, annually. Over one million gallons of wine could have been manufactured from grapes grown in Los Angeles this year. We shall soon become a great wine-producing country, and export, annually, millions of gallons.

Sugar beets and Chinese sugar cane have been raised this season, in several sections of the State, sufficient in quantity to fully test the practicability of raising them for the manufacture of sugar; and who doubts that we shall not soon become a great sugar-producing country?

The culture of hemp in different sections of the state, this season, fully proves the adaptation of our soil and climate to its perfect growth.

The adaptation of our country to agricultural pursuits, and the capacity of the soil for grain and fruit-growing, seem to have been almost unknown until within the last seven years. Yet we now find that the state contains about seventy-seven millions of acres suited to agricultural and grazing purposes, distributed as follows: forty-two millions adapted by nature to cultivation; five millions of tule lands, easily reclaimed, and thirty millions of grazing land. There are already under cultivation, five hundred and seventy-nine thousand acres, of which one hundred and seventy-eight thousand nine hundred and sixty-three acres have produced three million nine hundred and sixty-eight thousand six hundred and ninety bushels of wheat; one hundred and fifty-four thousand six hundred and seventy acres have produced four million six hundred and thirty-nine thousand six hundred and seventy-eight bushels of barley, and thirty-seven thousand six hundred and twenty acres have produced one million two hundred and sixty-three thousand three hundred and fifty-nine bushels of oats. There are, also, in the state, ten thousand six hundred horses, thirty thousand mules, six hundred and eighty-four thousand head of cattle, two hundred and fifty-three thousand sheep, one hundred and eighty-six thousand five hundred and eighty-five swine, and two hundred and sixty-six thousand three hundred poultry.

In view of the above statistics, no man, who has a reputation worth risking, will hazard the assertion that California is not as eminently an agricultural as a mining country.

The committee left Stockton on the 20th of August, to visit the valley of San José. After traveling twenty-five miles, we reached the foot hills of the coast range, and thence followed up "Corral Hollow," eight miles, to the coal mines lately discovered. Found several large tunnels running into the hill sides, where a fair coal is found, undoubtedly in large quantities. From these mines to the San Joaquin river, some twelve miles, and to Stockton, thirty-five miles, is almost a dead level, well suited for land carriage to transport the coal. The largest and best mine is at the base of the hill, through which the contemplated Stockton and San Francisco railroad is to pass, by a tunnel one and a half miles long. Passing over this steep hill, (one thousand five hundred feet in high,) we entered the large and beautiful Livermore Valley, so celebrated for its herds of

twenty thousand cattle. Following the foot hills, over one of the best roads, and through one of the most picturesque districts in the state, we stopped, for the night, at the well known Hot Sulphur Springs, sixty-five miles from Stockton. These springs are much resorted to, for the sulphur baths and medical qualities of the water. They are located at the base of a high mountain, looking down upon a lovely and romantic valley. Leaving the springs, the next morning we passed through a rich and well settled country, fifteen miles, to San José, where we met Dr. Cobb, the corresponding secretary; Mr. Daniels, one of the vice presidents; Mr. Lowe, the well known landscape gardener, and several other gentlemen, who accompanied us during our two days tour through the San José and Santa Clara valleys.

The celebrated valley of San José is the principal agricultural part of Santa Clara County, and is the best cultivated portion of this state, and is appropriately called the "Garden of California." Pomona and Flora reign here supreme. The numerous orchards, nurseries, vineyards and highly cultivated farms, congeniality of climate, deep, rich soil, and its enterprising inhabitants, must insure riches and prosperity. This valley, too, is celebrated as the valley of the muses and classics, having two incorporated colleges and several excellent academies. Number of students, two hundred and ninety; number of acres inclosed, sixty thousand; cultivated, twenty-five thousand five hundred; in wheat, fifteen thousand acres; barley, two thousand four hundred acres; oats, one thousand acres. Average yield of wheat, twenty bushels; barley, thirty-five bushels; oats, thirty-two bushels. Fruit trees, of all kinds, about one million. The one hundred orchards, in this valley, are more extensive, thrifty, and produce larger (excepting the peach) and more luscious fruits, particularly the pear and apple, than we have found elsewhere. The fruit and nursery business here is becoming extensive and profitable.

Live stock—horses, American, one thousand; Spanish, three thousand two hundred; mules, five hundred and twenty; asses, forty; colts, American, four thousand three hundred; oxen, eight hundred and fifty; Spanish, one thousand three hundred; sheep, one thousand four hundred; swine, five thousand. This valley, too, is celebrated for its artesian wells, numbering over one hundred and twenty, some discharging four thousand gallons per minute.

Mr. Daniels, one of the vice presidents of the State Agricultural Society, has a beautiful garden, under fine cultivation, containing many varieties of native and foreign shrubbery, trimmed in various forms; also, a choice variety of fruit trees; an Osage orange hedge, five hundred feet long, four years old, five feet high, very compact, trimmed wedge shape, headed in every month. Has, also, a beautiful hedge of the same length, made of the California wild cherry or holly, which is found in the Coast Range Mountains in abundance—a curly leaf evergreen, of beautiful foliage; likewise, a beautiful hedge of the *Ulex Europæa*. Our state produces a great variety of beautiful evergreen shrubbery, well suited for hedges. The heath, equal to the Scotch or Australian. The *escalonia*, found in great abundance near Sacramento. Hawthorn, found on the Russian River. Gimesell, wild cherry, strawberry tree, cro-

nothus, growing in great abundance on the sand hills in San Francisco. Mr. Daniels has, also, eighteen varieties of choice foreign grapes, all bearing abundantly; also, pear trees, twelve varieties, three years old, full of large and luscious fruit.

Capt. Joseph Aram has a fine growth of all kinds of fruit trees, currants, gooseberries, raspberries and strawberries; also, one thousand grape vines, California; one thousand grape vines, foreign, twenty varieties; one thousand four hundred peach trees, one hundred apple trees, four hundred apricot trees, three hundred plum trees, fifteen varieties; five hundred pear, thirty varieties; one thousand weeping willow, and five thousand walnut.

He has an Osage orange bush, (or rather tree,) three years old, over twenty feet high.

Partly surrounding the flower garden is a beautiful Osage orange hedge, five hundred feet long, and five feet in height, trimmed to a sharp point, presenting a solid surface of verdure. This hedge, for its true and even surface, and compactness, surpasses any that we have observed in the state. Mr. Aram's mode of culture is, to let it have one year's growth, then head down to within six inches of the ground, and trimming monthly afterward. He cuts about half of the new growth at each pruning; a system which throws out laterals from the stem close to the ground, and produces, in three years, a close, compact hedge, which a squirrel could not pass through.

Mr. A. irrigates his grounds by an artesian well. Soil, rich, deep loam, somewhat sandy.

We were much interested in visiting the garden and residence of Mr. F. G. Appleton. The grounds are very tastefully arranged. What principally attracted our attention was the apiary, containing over two hundred hives, all doing well, each hive producing from three to four swarms yearly. The honey is of the finest quality. Experiments made in different parts of the state the past year, give full assurance that there is no part of the world superior to California for the honey bee. Price of honey, per pound, fifty cents; price of swarms, in hive, one hundred dollars.

Judge Hester has a fine and highly cultivated fruit and ornamental garden; has eleven hundred apple trees, all of large and healthy growth, four years old. Measured apples, of the "Gloria Mundi" variety, fifteen and a half inches in circumference, and several weeks to mature. Also, has several hundred peach, plum, pear, cherry, apricot and nectarine trees. Irrigates by an artesian well. Soil, light loam.

Dr. Cobb has half an acre of hemp, grown on a stiff, clayey soil, without irrigation or cultivation, averaging twelve feet in height, some stalks being seventeen feet high. Its rank growth may be considered a fault, but the fibre had the appearance of being fine and good. Hemp has been raised this season in different sections of the state, and on different soils, and produced large crops. If the quality proves to be good, there is no reason that our state should not be a great hemp producing country, and in a very few years compete with Russia.

The fine orchard of Mr. Case has four hundred apple trees, two hun-

dred peach, sixty cherry, sixty plum, sixty pear, nectarine, apricot and quince, all in full bearing. The apple and pear trees are of many rare varieties, and the fruit very large. Measured one apple, "Gloria Mundi," sixteen and one-eighth inches in circumference, having yet several weeks to mature. Noticed a small pear tree, "Duchess de Angouleme," three and a half feet high, bearing twenty-eight pears, each pear supposed to weigh over one pound. Has a nursery, containing over ten thousand fruit trees, all looking very thrifty. Uses no water, but stirs the earth often. Clay soil. The apples in the orchard, sold this season for seventeen hundred and fifty dollars.

Major Hensley's residence, extensive grounds, arbors, rustic work, summer-house, fences, barn, fruit, flower and vegetable gardens, combining the ornamental with the useful, render this place one of the most charming and costly homes in California. The landscape garden contains a large variety of native trees, planted three years since, making now quite a dense forest. The fruit garden contains many rare varieties of apple, pear, peach, and plum trees, from three to four years old, all in full bearing. Observed quite a number of apple and peach trees, trellised in the espalier style, all in full bearing.

This beautiful place was laid out by Mr. J. R. Lowe, of that city, and is another proof of his taste and talent as a landscape gardener. Landscape gardening is becoming quite fashionable, combining the beautiful and picturesque. The careless, irregular, but graceful, curves and windings of the carriage drives, bordered with flowery hedges, lawns, groups of rare and well shaped trees, surrounded and mingled, forest-like, with shrubs and running vines, please the admirer of nature far more than the old geometric style, or a stiff, set, mechanical form.

Thomas Fallon, Esq., has the best producing pear trees, probably, in the state, having fruit of remarkable size and quantity, many of the pears measuring over fourteen inches in circumference. He has four old pear trees, planted by the old Spanish missionaries over sixty years since, and grafted in 1854 with the Bartlett; producing three thousand pounds this season, which sold for six hundred dollars. On one small pear tree, four years old, we counted; on a small limb, nine inches long, ten large pears, weighing over one pound each. On less than twenty feet square are fifteen pear trees, of several varieties, bearing more fruit in weight than wood, some weighing over two pounds. One limb, eighteen inches long, bearing twenty-two pears, weighing over one and one-half pounds each. The fruit of this little garden, of thirty trees, sold for sixteen hundred dollars. Soil, rich, light loam, well cultivated and watered.

We were highly pleased with our visit to Mr. D. F. Adams' nursery, which contains, on three and one-half acres of land, twenty thousand apple trees, seventy-five varieties grafted, and eight-hundred pear trees, ninety-five varieties. This is one of the best nurseries in the state. The uniformity of the trees and seedlings, the frequent cultivation and irrigation, large and thrifty growth, perfect neatness of the grounds, and manner of irrigation, which is by running water in ditches twelve feet apart, watering the extremity of the roots instead of the trunk,

and heading down his trees, thus making a handsome bush top instead of growing a whip-stalk, shows skill, care and experience, and a scientific horticulturist. Dwarf fruit trees are the prevailing fashion; severe winter pruning, starting branches twelve or twenty inches from the ground, will produce earlier and better fruit than any other mode.

Mr. James R. Lowe has, on two acres, including house, shed and barn, over twenty-four thousand trees of the following varieties: three thousand three hundred and sixty cherry, twenty varieties; two thousand pear, thirty varieties; one thousand plum, all two years old, many of them in bearing; five thousand peach, budded with peach, apricot and nectarine; five thousand five hundred apple, eighteen varieties; one hundred and twenty-six peach, one hundred and forty apple, eighty pear, in bearing, all of superior growth and fruit; four thousand currants, three varieties; a large variety of rare shrubbery, and a fine, well trimmed Osage orange hedge surrounding the garden. Mr. Lowe is an experienced and scientific landscape gardener, educated in England to the art. The many beautiful gardens planned and finished by him in different sections of the state, fully attest his taste and ability.

The committee next visited the "Commercial Nursery," Messrs. Smith & Winchell, proprietors. This well known nursery contains one hundred and fifty thousand trees, viz: peaches, thirty varieties; apple, ninety; cherry, three; plum, twenty; pears, forty; apricots, six; nectarines, eight; also, a large quantity of currants, gooseberries, raspberries, strawberries, and a large assortment of shade and ornamental trees. Messrs. S. & W. have adopted, like many others, the style of heading in their fruit trees, making a low and bushy top, instead of the long, unsightly whip-stalk, to be blown down by the first high wind, or if, by chance, it should keep its upright position, will require twice the age to mature fruit. The thousands of one and two years old apple and pear trees in this nursery, are large and thrifty, and quite ornamental. They use but little water, substituting weekly use of the cultivator.

Mr. Pellier has twelve acres in orchard and nursery, containing six hundred peach trees, eight hundred apple, four hundred pear, ten thousand seedlings in nursery, and six hundred grape vines, twenty varieties. Soil, dark loam and sandy. Irrigates by artesian well.

The committee take great pleasure in noticing the beautiful flower and ornamental garden and nursery owned by Wm. O'Donnell. This highly cultivated garden of twelve acres is but two years old. The arbors, walks, ornamental and fruit trees, of uncommon growth. Flowers in great variety; exotics, roses, etc., would well compare with gardens in the older states that have been cultivated eight or ten years; all giving evidence of skill, industry and perseverance worthy of a Californian.

Mr. O'Donnell has in his garden forty-six thousand four hundred trees, vines, shrubs, etc.; ornamental standard trees, one thousand; standard, apple, pear, peach, cherry, plum, two thousand; ornamental shrubbery, for sale, five thousand; roses, of every variety, five thousand; black locust and honey locust, two thousand; alanthus, judas tree, catalpa, two hundred; Australian acacia, yellow acacia, two thousand; apple, pear, peach, cherry, plum, six thousand; currants, gooseberries,

raspberries, three thousand; peaches, in bud, ten thousand; English ash, sugar maple, three thousand; running vines, of every variety, four thousand; evergreens, of every variety, three thousand; quince, four hundred; elm, poplar, two hundred; snow balls and lilacs, two hundred; grape vines, three thousand.

Mr. L. E. Gould's large and fine orchard contains ninety acres, and is under high and careful cultivation, every department exhibiting horticultural skill and industry. The soil is peculiarly adapted to the culture of all fruits, being a deep, mellow, rich loam, with a good mixture of sand and gravel.

The nursery contains three thousand apple trees, two years old, eighty-four varieties; thirteen thousand, one year old; two thousand five hundred pear, forty-five varieties, one year old; cherries, fourteen hundred, thirty varieties; plum, eleven hundred, eighteen varieties; apricots, nectarines and grape vines, thirty thousand.

The orchard contains seven hundred apple trees, eight hundred peach, five hundred pear, three hundred and fifty cherry, one hundred plum; grapes, in nursery, two thousand; foreign grapes, one thousand; seventy varieties; two and one-half acres in strawberries, six varieties; Longworth's seedlings and Boston pine, doing the best; these are prolific bearers in all sections of the state.

We noticed a field of Chinese sugar cane, doing remarkably well, and without much care, and no water; another proof that this cane can be cultivated in this state to great perfection.

Mr. Wm. M. Lent's residence occupies one of the most commanding situations in Santa Clara, and is surrounded by some eighteen acres of highly cultivated grounds. His grape vines, peach, apple, pear, and other fruit trees, are but little over two years old, and most of them in full bearing. In the fruit garden are three hundred and twenty peach trees, three hundred and twenty-five apple, fifty cherry, forty apricot, three pear, fifteen thousand seedling peach, three hundred grape vines, twenty varieties; two hundred California, all trellised on large and highly finished arbors, which extend, in several sections, over two thousand four hundred and sixty feet; has, also, two acres in strawberries, of several varieties; a beautiful escalonia hedge, six hundred feet long; noticed a splendid red-wood tree, eighteen feet high, but two years from a small seedling, set out at the commencement of the winter rains. In the mountains near by, are a great variety of evergreens, and thousands are yearly transplanted, to no purpose, from the fact that they are set out in February and March; if they are carefully taken up and transplanted in December, or during the first rains, ninety in one hundred will live. Has two large artesian wells, which give abundance of water for irrigation; soil, deep, rich clayey loam.

We spent a couple of hours, very pleasantly, and with much interest, with Mr. Burtice, the proprietor of "Laurel Farm." This is one of the most splendid and highly cultivated farms in the state, contains six hundred acres, handsomely fenced, and well stocked with sixty milch cows, one hundred and forty cattle, and twenty-five horses. The beautiful little river, Guadalupe, skirts one side of this farm, which affords abun-

dance of water for all purposes. The cottage is approached, from the road, by a handsome wide drive-way, half a mile in length, lined, on either side, by three rows of black locust. Approaching the residence, from another direction, is a beautiful drive-way, one mile in length, skirting the Guadalupe, shaded by four rows of locust, and other ornamental trees. The umbrageous trees, of several varieties, and the dense growth and deep green foliage on the river banks, give quite a tropical appearance. Leading into the landscape garden, which is finely shaded by clumps and groups of ornamental trees, well trimmed shrubbery, roses, etc., is a locust arbor, four hundred feet long, thirty feet high, the limbs trained across, at the top, so as to form a complete bower. Near the landscape garden is a handsomely arranged flower garden, well filled with choice flowers, and under high cultivation. In the rear of these are the vegetable and fruit gardens.

Surrounding the whole is a hedge of Osage orange, *escallonia* and *cro-nothus*, trimmed in neat and handsome forms. The Osage orange hedge, three-fourths of a mile in length, is considered the best in the state, and well worthy of the first premium. This hedge is four years old, planted two rows deep, six inches apart, trimmed from four to six times a year. In rear of this hedge are four rows of the black locust, planted four feet apart, which answer the double purpose of breaking off the wind and producing a beautiful shade for promenades and drives.

In the fruit department are seven thousand grape vines, of several varieties; three thousand peach, apple, pear, plum and cherry. One acre of raspberries, strawberries, gooseberries and currants, of fine, healthy growth, and very prolific. The soil, alluvial, and a deep, rich black loam.

Your committee spent an hour, very pleasantly, with Mr. Lick, the proprietor of the celebrated Lick's flour mills, which are said to be the most costly and best finished mills in the state. The mill, granary, grounds and dam cost over half a million dollars. It contains four runs of French buhr stone, and turns out two hundred barrels, per day, of superior flour. Mr. Lick has an orchard of forty acres, containing four thousand apple, pear, peach, plum and cherry; most of the trees were bearing, and but two years old.

Mr. J. Cook has a lovely little residence on the Alameda road, which is surrounded with flowers, fruit trees, and a willow hedge twenty feet high, one thousand feet long, and one dense mass of green foliage, so compact that a rabbit could not pass through it. Noticed several valuable seedling peach trees, of large growth and fine fruit, one measuring nine and a half inches in circumference, three years old; the fruit of uncommon size and flavor. Mr. Cook deserves great credit in producing so large a growth and variety of trees and shrubbery on reclaimed land; four years since, it was a swamp or bog-hole. He has also a fine variety of grape, growing vigorously. The black Moroc-co, loaded with large clusters of grapes. This delicate grape does well in this section of the state.

Stockton Ranch.—This large and beautiful ranch, two miles from San José, owned by Com. Stockton, contains two leagues, and is carried on by Mr. Kennedy, a skillful and practical agriculturist.

One hundred and seventy-five acres produced, this season; six thousand bushels of wheat, which is a large crop for this uncommonly dry season. The average crop, in this valley, of barley and wheat, this season, is about twelve bushels to the acre.

In the orchard are three hundred apple, four hundred peach, and two hundred other kinds of fruit trees; one acre of strawberries, of several varieties. Soil, deep, rich, black loam.

On the 16th of September, the committee commenced visiting several sections of Alameda County, which is one of the most extensive and flourishing agricultural districts in the state, containing eight hundred square miles, and having fifty-six thousand acres under cultivation, producing, last year, four hundred and sixty-two thousand bushels of wheat, ninety-one thousand eight hundred bushels of barley, two hundred and sixty thousand bushels of oats, ten thousand bushels of corn, twenty-one thousand seven hundred bushels of potatoes, and thousands of bushels of buckwheat, rye, corn, beans, and all varieties of vegetables. Butter, twelve thousand pounds; cheese, one hundred and sixty-three thousand pounds. Wool, twenty-eight thousand pounds. Of stock, four thousand horses, one thousand mules, sixty-three jacks, four thousand two hundred and twenty-three cows, and thirteen thousand three hundred and twenty-five cattle. Fruit trees, of all varieties, over one million. The average crops of wheat and barley are larger than in any other county. Potatoes are raised in large quantities, but not so good as those raised in Russian River Valley, the soil being a clayey loam.

Our first visit was at Rev. Mr. Myers', who lives in Alameda, an enchanting and lovely spot, one mile from the ferry, approached by an even and smooth road, passing through a forest of evergreen oaks, by fine gardens and handsome cottages.

The extensive "Pioneer Nursery" and orchard of Mr. Myers, is cultivated with great care and neatness. Trees, generally, looking healthy and vigorous, considering that they have had no irrigation; the light, sandy soil, requiring more irrigation than the clayey and dark loamy soils. The orchard and nursery, of twenty-five acres, contains the following list of trees: Apple trees, three years old, forty varieties, twenty-four thousand; apple trees, two years old, forty varieties, eight thousand; apple trees, thirty approved varieties, eighteen thousand; pear trees, fifteen varieties, one and two years old, one thousand; cherry trees, twelve varieties, one and two years old, one thousand; plum trees, twelve varieties, two years old, one thousand five hundred; plum trees, fifteen varieties, one year old, four thousand; nectarine trees, one and two years old, four varieties, one thousand; apricot trees, one and two years old, four varieties, two thousand; fig trees, purple, one year old, five thousand; grapes, foreign, two years old vines, two thousand; grapes, California, one year old vines, three thousand; currants, five thousand; seedling peach trees, five hundred and fifty thousand.

Opposite Mr. Myers', is the large and extensive nursery of the Hon. Wilson Flint. This is the largest nursery in the state, and contains a great variety of fruit trees and seedlings. The apple, pear, plum, and

cherry, one and two years old, are large and thrifty; uses no water, but substitutes the cultivator. Soil, deep, rich, clayey loam, with a moist sub-soil. Following is a list of trees, numbering thirty-four thousand eight hundred: peach trees, one year's growth from bud, forty varieties, seventy-five thousand; seedling peach trees, in bud, thirty thousand; apricot trees, one year old, from bud, six varieties, twenty thousand; apricot trees, in bud, fifteen thousand; nectarines, one year old, from bud, five thousand; plum trees, one year old, thirty-six varieties, twelve thousand; plum trees, two years old, two thousand; plum trees, in bud, eighteen thousand; plum trees, one year old, forty varieties, five thousand; pear trees, two years old, one thousand; seedling pear trees, four thousand; quince trees, six thousand; cherry trees, one year old, sixteen varieties, eighteen thousand; cherry trees, in bud, seven thousand; seedling cherry trees, twenty thousand; apple trees, two years old, thirty varieties, fifteen thousand; apple trees, one year old, twenty varieties, fourteen thousand; seedling apple trees, twenty-five thousand; pomegranate trees, one thousand; grape vines, two years old, thirty thousand; grape vines, one year old, twenty thousand.

Near Mr. Flint's are the beautiful residence and highly cultivated grounds of Mr. Sather. Mr. S. has a very handsome avenue, running from the residence through the flower-garden and orchard, one-third of a mile long, bordered on either side by large and well shaped cherry trees, which are very ornamental. The orchard contains three hundred peach, two thousand two hundred plum, apple, pear, and cherry trees; irrigated by artesian well; one hundred and sixty feet deep, discharging nine hundred gallons per minute.

After visiting the large and extensive orchards and nurseries of Alameda, we visited Mr. Lewelling, on San Lorenzo Creek, some ten miles distant. Mr. Lewelling has forty acres in orchard and nursery, surrounded by an Osage orange hedge, two years old, and one mile long. This hedge is planted in two rows, six inches apart, pruned back one-half, three times a year; the compact, hedge-like appearance, is an evidence of a good mode of culture. In orchard and nursery, are twenty-five thousand apple trees, two years old, one hundred and two varieties; one thousand five hundred peach trees, twenty-four varieties; one thousand five hundred peach trees, two years old; four thousand five hundred pear trees, thirty-four varieties; eight hundred pear, on quince stock; one thousand five hundred pear trees, in nursery; eight hundred plum trees, two years old, twenty-one varieties; four hundred plum trees, in nursery; apricots, fifteen varieties. Mr. Lewelling has, also, a large variety of gooseberries; bearing prolifically.

This nursery is unsurpassed in the state. The uniformity of size, rapid and healthy growth, fine, bushy heads of the apple, pear, peach, and cherry, exceed all other which have come under our observation in this state. It is a perfect sample of neat and skillful culture, and is well worthy of all praise.

Mr. Lewelling, like an experienced horticulturist, adopts the true principle of heading in his fruit trees, giving them a handsome, ornamental appearance. The soil is peculiarly well adapted to a vigorous

growth of all trees; a deep, rich, mellow loam, and a moist sub-soil. Mr. Lewelling waters but seldom, and uses the cultivator twice a month.

Contiguous to Mr. Lewelling, is the large apple orchard of Mr. John McMurtrie, containing one thousand six hundred trees, two years old, planted sixteen and a half feet apart, in the quincunx style. The trees look healthy, but are of small growth, although the soil is like that of Mr. Lewelling's; owing, undoubtedly, to a large and uncommon growth of potatoes, the tops of which completely cover the ground. An orchard should be cultivated for one purpose only. Fruit trees will always rebel against introducing, for their companions, vegetables, or other productions.

Returning from San Lorenzo to Oakland, we visited the garden and nursery of Mr. George Lee, containing five and a half acres. This garden produces the largest variety and most luxuriant growth of tropical fruit and ornamental trees in the state. Has one thousand orange trees, in nursery, one year old, of fine size; he also has the pine apple, banana, citron, lemon, coffee, nine varieties of the acacia, and many other tropical fruits and shrubs, all looking healthy and vigorous. The orchard contains four hundred apple trees, four hundred peach, two hundred and fifty fig, plum and cherry; two acres strawberries, of the "Boston Pine" and "British Queen" varieties, which have proved to be the best and most prolific kinds, in all sections of the state, yet cultivated. Mr. Lee is an old cultivator of this fruit, and has grown all varieties in this country, and gives these kinds the preference. A light, mellow, sandy soil, and plenty of water, suits these varieties perfectly, and will produce abundantly seven months in the year.

Messrs. White & Kelsey, near Oakland, were absent at the time of our visit, but we learned the following facts, which are of great interest: Their garden contains ten acres, four of which is planted to raspberries, three to strawberries, two to peach, plum, apple, cherry and quince trees, and about one acre to currant and gooseberry bushes, grape vines and nursery trees. Plums, in variety, have ripened beautifully. They have tried many kinds of strawberry, but now discard all kinds but the "British Queen" and "Boston Pine." They have marketed forty-two hundred pounds of strawberries, and over eight thousand pounds of raspberries, this year. They think the "Isabella" grape will soon supersede all others for open culture. This fruit garden is worthy of a visit from any lover of Pomona, though it be enjoyed at much expense and inconvenience.

Opposite Mr. Lee's, Messrs. Wolf & Lusk have eighteen acres of strawberries, four varieties; the "British Queen" and "Boston Pine" yielding best, fruit being hard, of uncommon size, rich meated, and the vines prolific bearers. The soil, a rich, mellow loam, requires but little irrigation, but the plow often—a mode getting into general use. Cultivation, deep and often, is absolutely necessary in this country; but fruit growers will find water is also necessary to produce good quantities and qualities. Water is the great fertilizer for the dried up earth.

Near Messrs. Wolf & Lusk's is the finest orchard of dwarf fruit trees in the state. Mr. Fountain, the proprietor, was an old and experienced

fruit cultivator in the Atlantic states. The neat appearance of the orchard, highly cultivated grounds, handsome shaped dwarf trees, two years old, four feet high, and most of the apple and pear in good bearing, fully attest his skill as an experienced horticulturist. The orchard, of three acres, contains one thousand and sixty apple and pear trees, all dwarf, from root graft. Mr. F. prefers this style of growth—it produces larger and better fruits, and from two to three years earlier than in standards. His mode of culture is severe pruning and heading in during the winter, starting the branches from the ground; uses no irrigation, and plows four inches deep until the first of June. A good system, if the luxuriant growth is an evidence. The soil is a sandy, mellow loam.

Visited Mr. Beard, proprietor of the beautiful and highly cultivated farm formerly belonging to the old San José Mission. The old orchard of pear, olive, fig, and other tropical fruits, was in full bearing, producing large quantities of choice fruits. In the flower garden are many rare flowers and evergreen shrubs. Saw the lemon verbenas, two years old, measuring twelve feet in height, and very bushy; nine inches in circumference at base. Also, saw a rose geranium, quite a tree. The land in this neighborhood is uncommonly productive, being a black loam, well intermixed with fine sand and alluvium.

The committee being unable to go personally to the extreme southern portion of the state, secured the services of a gentleman in whose judgment they had much confidence, and from whom the following report has been received.

Sept. 21st, visited the vineyard of Mr. Geo. Bareham, containing seventeen thousand vines, in good condition and full bearing. Mr. B. has, also, about two acres of sugar cane, one-half three years old, and the other planted last spring. The whole is looking well, and promising a good yield when at a proper age. He has, also, about four acres planted to fruit trees, all doing well.

Mr. Wolfskill, south of the town of Los Angeles, has a vineyard of about forty thousand vines, heavily loaded with fruit. He markets, this year, one thousand boxes of grapes, and makes the remainder into wine and brandy. He also has several fine groves of orange, walnut, and other fruit trees, all in bearing and looking well. He has planted, this year, fifteen thousand orange and other fruit trees, all of which look well. His grounds are watered by a natural stream, running through the entire place.

On Tuesday, Sept. 22d, visited the extensive establishment of Sanse-vaine Brothers. They have fifty-three thousand vines, handsomely dressed, and richly laden with fruit. They expect to make eighty thousand gallons of wine this year. Their eight large cellars, filled with wine and brandy, present an astonishing picture of rapid wealth. Their grounds are handsomely laid out, and fenced with growing willows. An arbor, three hundred yards long, is covered with grape vines loaded with fruit, which, in addition to their elegant flower garden and six fine fountains, makes their place one of unusual beauty and grandeur. This establishment is yet without a successful rival in this country.

On the same day, examined the vineyard of Dr. Hoover, containing seven thousand vines, of luxuriant growth, and in full bearing. He has, also, a few choice fruit trees, and beautifully arranged grounds. His dwelling is of brick, and has an air of neatness and comfort too seldom found.

Called, also, upon the Messrs. Froehling, who are making wine from several vineyards this season, hoping to reach an aggregate of eighty thousand gallons.

Called, the same day, on Dr. Halsee, who has devoted the last fifteen months to experimenting, with a view to produce wine without those poisonous substances with which most California wines are adulterated. Some of his wines, from two to four weeks old, had the flavor of ordinary wines of six years. His neat cottage, overhung by green willows and surrounded by climbing roses, and a neat flower yard, presents a most desirable appearance.

Mr. Manuel Requena has a beautiful little vineyard, well cultivated, and very fruitful. He designs to make eight thousand gallons of wine the present season. His fruit orchard contains a choice selection of trees, and is finely laid out.

Dr. White has displayed much good sense, as well as taste, in the construction of his dwelling, which is both convenient and elegant. His vineyard, though not extensive, is rich in choice fruit. His grounds are thickly, though beautifully, set with a great variety of fruit and ornamental trees. His wine is also of the best quality.

Having thus briefly noticed a few of the many interesting establishments in this section of country, and leaving the same with much regret, on account of the many happy impressions received here, we most heartily commend this country to the notice of any who may seek a home, where the vine, the olive, and the pomegranate, are ever in their glory.

On behalf of the committee, a gentleman of experience and ability visited Stanislaus and San Joaquin counties and adjacent districts, from whose elaborate report the following is condensed :

On the south side of the Stanislaus River, and in the eastern portion of the county, there is a fine mining district. The bank or river claims have yielded largely where water could be procured ; a new ditch is now being constructed for the supply of the surface diggings back from the river.

Lagrange, the seat of justice in Stanislaus County, contains eight hundred inhabitants, and is a flourishing town. Messrs. Pine, Nelson & Co. have constructed a ditch, six miles long, which affords an abundant supply of water for all the diggings in the vicinity. South and east from Lagrange, between the Tuolumne and Merced rivers, there are extensive gold fields, but only slightly worked, on account of scarcity of water. An extensive ditch, for the remedy of this deficiency, is now commenced, and is designed to run through the towns of Oak Flat and Coulterville, and then on the dividing ridge between the two rivers to the table lands, near Lagrange, which are very rich. Several very rich quartz veins have been discovered and partially developed in this vicinity

during the last season. In a district of country some twenty-five miles east of Lagrange, there are several fine steam saw mills. Smith & Dudley have two mills, capable of making from twelve to sixteen thousand feet of lumber per day; Messrs. Nelson & Co., Caughrin & Brother, and Reed, have each a mill of equal capacity. Pine timber is here found, sufficient to last fifty years. Lumber is worth twenty to twenty-five dollars per thousand feet at the mills. There is also much good agricultural land in this vicinity. In the vicinity of Coulterville there are many fine vegetable and fruit gardens; Mr. Lewis, Mr. Wheeler and Mr. Merver, all have fine assortments of fruit, in great perfection. Several French horticulturists, at Lagrange, are succeeding admirably with the grape.

On the Stanislaus River, James Birney has a fine orchard, in full bearing. On this river are some very rich, natural, hay lands. The soil is a composition of sand and vegetable decomposition, deposited by the annual overflow of the river, to the depth of ten or fifteen feet.

Following up the San Joaquin, we find a vast amount of tolerably good hay land, but very little that is really good grain land. Back, near the coast range of mountains, the case is different. The valley is eminently a grazing country, the quality of which is shown in the vast quantity of fine stock grown there.

A few miles up the Merced, from its confluence with the San Joaquin, we find a good grain district, which continues far up among the foot hills. There are many large fields of Indian corn, yielding fifty to seventy-five bushels to the acre. Dr. Barfield has a fine grain and fruit farm, having one thousand five hundred fruit trees, all doing well. Mr. Ostrander has the best orchard in this part of the state.

On Bear Creek, and on Mariposa Creek, there are some excellent lands, and many good farms. Total amount of grain harvested in Merced County during the present year, about two hundred thousand bushels. Between the river bottoms and the table lands, there are inexhaustible quarries of fine free-stone, well adapted to building purposes. On the river bottoms, tobacco makes an enormous growth. Wheat, barley, and millet, also do remarkably well.

All of which is respectfully submitted.

E. S. HOLDEN,	} Committee.
GEORGE SANDERSON,	
P. EDWARD CONNER,	
J. C. COBB,	

REPORTS OF COMMITTEES OF AWARD.

GRAINS, &c.

Your committee having performed the duty assigned to them, beg leave to report as follows:

WHEAT.

First premium, for best ten acres, to Mr. John Grattan, of San Joaquin County.

Mr. Grattan's certificates show a yield of four hundred and eighty-seven and a half bushels on ten acres of land, and although, like all the grain crop in the country, slightly affected by the drouth in early spring, is large in the berry, well cleaned, and free from foul seed.

The sample shown is Chile, slightly mixed with Australia and club head.

Mr. Grattan further states, that "this grain was raised on the low, black loam on the Calaveras meadows. This ground was plowed by the middle of January, about six inches deep; sowed down and harrowed in, by harrowing four times; seeded 20th January. Part of this grain was eaten out twice by the worm, and resowed, first on February 5th, and lastly on the 20th of March. This caused the crop to fall at least fifty per cent. short of what the yield would have been had it not been disturbed by the worm."

A fine sample of wheat is shown by Mr. Richard Wall, of San Joaquin: Chile, mixed with club head; plump, and well cleaned.

A sample of Mexican wheat, raised in Contra Costa, by Messrs. Lohsee Brothers. Reported yield, "forty-five bushels, of sixty-seven pounds to the bushel, to the acre." Quality and berry very fine.

Samples of Wheat, in the Head.—Samples of wheat are also shown by Messrs. Charles Ashley, Sallin & Butler, Doctor Grattan, Starkweather Bros., G. J. Leach, J. Smythe, and Cooper & Overhiser, all of San Joaquin County, from the region adjoining the Calaveras River; all of superior wheat.

Also, a fine sample of wheat from Mr. Ernest Wagner, of Stanislaus.

Fine specimens of the "Mummy," or Egyptian wheat, are shown by Messrs. J. Days, S. Williams, and Starkweather Brothers, all of San Joaquin. Also, Maj. Bidwell, of Butte.

BARLEY.

First premium, best ten acres, to Mr. C. J. Leach, of San Joaquin. Mr. Leach's certificates show a yield of eight hundred and seventy

bushels on ten acres of land. The grain, bright, handsome, and well cleaned. This, also, affected by the spring drouth. Mode of cultivation not communicated.

Your committee notice an extra fine sample of barley from the farm of Ernest Wagner, of Stanislaus River, the heads of which measured seven inches in length.

The committee regret not having more particulars in reference to this barley, its yield per acre, and time of planting. We recommend a special premium to Mr. Wagner.

Barley, in the Head.—Also, fine samples of barley, from Messrs. Smythe and Starkweather, of San Joaquin.

Also, a sample of "Bald" barley, from the farm of Mr. Smythe.

RYE, IN THE HEAD.

A sample of rye, from Ernest Lodtman, San Joaquin. This rye is extra well filled, and large head. We award him a diploma, for the best sample of rye shown.

Also, a sample of rye from Ernest Wagner, Stanislaus; and a sample from Messrs. Wiley & Woods, of San Joaquin.

OATS.

Messrs. Long & Co., Alameda, show a beautiful sample of oats, from Pennsylvania seed, from late planting. As these parties have imported a seed which is evidently of excellent quality, we award a diploma.

Black Oats, in the Sheaf.—Messrs. Wiley & Woods, of San Joaquin, show a sample. Heads moderately heavy; straw, six and a half feet.

CORN.

First premium to Dr. L. G. Lyons, of Ione Valley.

Shows beautiful samples of heavy and well rowed white corn, yielding, to quote the language of the accompanying certificate, "one hundred and nine bushels, of fifty-two pounds to the bushel, per acre."

Also, a sample of yellow "Gourd-seed" corn, from the farm of Mr. A. F. Potter, of Ione Valley, yielding, as per certificate, "eighty-four and a half bushels, of fifty-two pounds, per acre."

Your committee believe this to be the best sample of corn offered. We therefore recommend a special premium.

POTATOES.

The only lot entered is that of Mr. T. B. Parker, of Mokelumne River. The potatoes are of excellent quality. The reported yield is twenty-three hundred bushels per acre, but, as the evidences accompanying are loose and informal, your committee can only recommend a special premium.

ONIONS.

Mr. S. C. Tyler, of Georgianna Slough, shows a fine sample of onions, apparently from Australia seed, on which the reported average yield is

fifty-six thousand two hundred and fifty pounds to the acre. The documents accompanying are also informal. Your committee recommend a special premium.

GRASSES.

Though not strictly in the schedule pertaining to this committee, we call attention to the particularly fine sample of California "Timothy," grown on the farm of Mr. M. Williams, of this county. The heads are large, heavy and plump; the stalks very sweet. This sample affords full evidence that the grasses indigenous to the country have only to be noticed and cared for, to fill a want in California agriculture becoming each year more imperative. We recommend a special premium.

Also, a sample of wild clover, from the farm of Jacob Haeflich, of San Joaquin, five and a half feet in length, and which cut four tons to the acre. We recommend a special premium.

In conclusion, your committee would respectfully call the attention of grain growers to the importance of sending samples of grain grown in different localities to the annual fairs, accompanied with statements of quality of seed sown, time of sowing, and depth of planting and plowing. The accumulation of such facts would, in a few years, afford data which would go far toward lessening the hazards of grain production, as well as make evident the particular localities on which the greatest reliance may be placed for the production of certain crops.

And they would also remind grain growers and competitors for premiums that, to obtain premiums or satisfactory notice of their productions, something more is necessary than the mere entry of a bag or sample of grain, with a label of owner's name attached. It should be accompanied with its history, the source from which the seed has been obtained, and its length of time in the country, as well as the method of culture, and preparation of soil and seed.

J. W. OSBORN, Sonoma County,	} Committee.
Col. GEO. HAGAR, San Francisco,	
S. WILLIAMS, San Joaquin,	
S. T. NYE, San Joaquin,	

SUGAR CANE, COTTON, AND TOBACCO.

The committee on sugar cane, cotton, and tobacco, of California growth, submit the following report:

The committee found on exhibition but two samples of the cane, several of cotton, and none of tobacco. The grower of the cane states that he has an acre in cultivation. The sample produced, speaks well for its production and successful cultivation in this state. It has matured to six or eight joints, and is of full size. The success which this experiment has met, must dispel all doubts of the adaptability of our soil to the profitable and successful cultivation of this great and necessary staple, entering so largely into the every day use of all classes, and must

be hailed with pleasure by every true friend of the state. There is a reasonable prospect that at no very distant day we may be able to say, as in the case of wheat and flour, to the balance of the world, we have enough and to spare.

The committee also examined the several specimens of cotton, and, as with the cane, we have to report the successful growth of this great staple. We also examined, in contrast, Georgia upland cotton, and the growth of this state, from seed taken from the same parcel; and the improvement in fineness of fibre, of the native growth over the imported or Georgia grown, was manifest and striking; and in this, we have the concurrence of experienced spinners from the east. But the staple of the native is not quite so long, though fully as strong, as the Georgia cotton. This we attribute altogether to the lack of moisture in the earth where it grew.

We believe it a reasonable calculation, that, when our bottom or swamp lands are sufficiently diked to keep out the spring and summer floods from them, we shall be able to procure an article of cotton not only of finer texture, as is the case now on our dry lands, but one of superior length of staple; the two qualities that make a first rate article.

Several other samples examined, rate as fair upland. The one from Slocum's Bridge has the advantage of staple and texture over any of the others. The samples grown in Los Angeles county, are equal, if not superior, to the best Mississippi or Louisiana cotton, and, of course, superior to all others, and but one grade below Sea Island cotton. This sample is not of the Sea Island seed, but the Grey Pettey Gulf kind, proving, conclusively, the perfect adaptation of our climate and soil to the production of the very finest staple.

The last mentioned specimen of cotton is in the name of Mr. Gibson, represented by Mr. Osborn. It was grown on a loose soil. There being no number to refer to, we have given the name, and recommend the premium to be awarded to Mr. Gibson, for the best specimen of cotton.

The two specimens of cane exhibited, are, one by Mr. Temple, and the other by Mr. Boram. We recommend that the first premium be given to Mr. Temple, as exhibiting the largest quantity and best matured, if any difference; and the second premium to Mr. Boram, for small samples of good cane, nearly, if not quite equal to the first.

M. WALTHALL, }
S. M. McLEAN, } Committee.

ALFALFA, &c.

The committee to whom was referred the following articles, for awards, ask leave to report: upon alfalfa, Chinese sugar cane, beans, flax, broom corn, and hay.

The committee find on exhibition a sample of alfalfa from the "Quin-

tay Farm," Marysville, Yuba County, marked "specimen," with roots eight feet long. The committee regret that a full report did not accompany this fine specimen of the alfalfa, as it is one of those articles of product that are destined to make a revolution in the matter of the feed of stock, and as it is a subject matter which particularly received the notice of the president of this Society in his opening address.

There were samples of other clovers, some of native species, of great excellence. A sample of clover from Windsor Farm, by Mrs. Rhodes, of remarkable growth, deserving notice.

A sample of clover by Jacob Haeflich, Calaveras Meadows, of superior quality, yielding four tons per acre.

These all coming under the denomination of hay, deserve the notice and encouragement of the state, through the official organs.

One sample of beans, only, was exhibited; a sample of white beans, upon the vines, very luxuriant, the product of one hill, raised by J. A. Austen, Esq., Stockton. When this product shall be properly understood, and the quantity known that has been and is continually imported, a wise attention will be given to a crop that will always pay, if planted upon the right kind of soil. The cultivators of the soil should be aware that the people of California pay, annually, for many thousand bags of beans, imported from foreign ports, and thus a competition is brought to bear with a home product, that a little knowledge of the subject would enable them entirely to defy, and even become rivals in the very ports that now send to us.

FLAX.

One sample only was exhibited, by J. B. Manny, of San José, the product of one acre. No particulars accompany the sample. The matter is referred to the executive committee.

BROOM CORN.

Samples were shown by two persons, and not entered, which is very much to be regretted, as this product is one of great value to our state. Thousands of acres of broom corn have been raised the present year, and such has been its influence, that the importation of brooms, which has, heretofore, been large, has almost entirely ceased; and the brooms made in California are better and more beautiful than any ever shown from other states.

CHINESE SUGAR CANE.

This very important, new product of the soil, the committee feel, deserves more than a passing notice, although they regret that the growers of the various samples put on exhibition did not furnish the necessary and greatly needed statistics, to explain the quantity grown, and the products therefrom, and all the details so valuable to our state, for the future growers of this great staple. The committee found, on exhibition, samples of the cane, grown by B. W. Bourse, of Stockton, ten feet high; E. S. Holden, of Stockton, eleven feet high; T. K. Hook, of Calaveras; G. E. Clark, of Antioch, eleven feet high; L. A. Gould,

of San José. The last mentioned, represented a crop of two acres, said to be equal to thirty or forty tons per acre. All these specimens are well grown, and full of heads.

From all reports upon this article, we find it, generally, to be grown without irrigation; and it is to be hoped that all the growers will hereafter report in full upon all crops grown, and the manner and full system of cultivation. Your committee earnestly hope that all the contributors to our fair, hereafter, will consider this particular subject, and, by keeping a record of the time and manner of planting, quantity planted, and amount harvested, they can, by so doing, confer a lasting good upon our whole state, and thus each grower become a benefactor to his neighbor.

The committee cannot close this report without the special remark, that, although the articles embraced in the list to report upon have not been more largely represented, yet they believe there have been grown, the present year, in California, many hundreds of acres of alfalfa and other clover, and many scores of acres of sugar cane, hundreds of acres of beans, thousands of acres of broom corn, and acres of flax; and it is to be hoped, nay, strongly believed, that a brief time only can elapse before all the articles named by your committee shall be among the great staple products of California, answering all her wants in these articles, if not to be largely exported.

Some articles entered, without name or number, the committee refer to your board for adjustment.

All of which is respectfully submitted.

For the committee,

JAMES L. L. F. WARREN.

FOWLS.

The committee appointed to examine fowls, submit the following report:

We found no turkeys, geese, nor ducks, on exhibition; but some fine exhibitions of fowls, Nos. 4 and 5, by Messrs. Long & Bro., of Alameda County, to whom we award the premium.

JAS. LAWSON,	} Committee.
CHARLES ASHLEY,	
C. W. COOK,	
H. M. FANNING,	

FRUITS.

The committee appointed to examine the several classes and varieties of fruits exhibited, to award premiums thereon, beg leave to submit the following:

The growing importance of the fruit raising business, on the Pacific slope, as well as the extraordinary facilities furnished both by soil and

climate, and the (more than common) interest manifested in the cultivation of fruits, especially those fruits indigenous to the temperate zone, all indicate the necessity of care on the part of those who attempt to make a report upon this subject.

It would be impossible to notice, in detail, all the different varieties of the various classes of fruits cultivated in California, even of those imported from the various other states and from other countries, since 1850. Many of the several classes, and especially some varieties, require longer time and a greater variety of treatment, in order to develop fully their peculiar characteristics; and it is well known to all who have followed fruit-growing as a business, that the first crop on a young tree will often vary very much from the original type. Just so in California, where that business is yet in its infancy. It is true, general characteristics can almost always be detected, but there is such a wonderful tendency (we cannot call it any thing else,) to redundancy, such extraordinary bearing, young trees of three and four years old sustaining such abundant crops of large, heavy fruit, and the richness of flavor also keeping pace with the prolific character of the trees, and the extraordinary size of the fruit, especially of apples, pears, peaches, plums, apricots, etc., that at first sight, it is no wonder their old friends hardly know them. This tendency to precocious bearing and extraordinary size of some specimens of apples, pears, peaches, etc., in the first crop on young trees, is not entirely peculiar to California; and many have been anxiously watching for the last two or three years, to see if, as the trees advance more toward maturity, they show any tendency to fall back, in their size, crop, and flavor, to their common character in their old eastern home. But, hitherto, no such tendency is observable, except in some few cases, where improper management, bad culture, or over bearing, has evidently been the cause. Wherever the trees have been well cared for, and not allowed to over bear, the great increase of size and richness of flavor are still apparent; and every year adds its testimony that all the varieties of apples, pears, peaches, plums, etc., will have in this country a decided California character, viz: largeness of size, increase of weight, brightness and richness of color, and sweetness of flavor.

The greater part of the valleys, side hills, and table lands, on the western slope of the Sierra Nevada Mountains, may be brought into requisition for the culture of fruits. Enough has already been done to indicate what may be expected, as population increases and facilities for intercourse improve. Some of our finest peaches, pears, and all the varieties of melons, have already been grown, in the highest perfection, high up in the mountains; and the works of the miners, who are unwittingly preparing the ground in many places, by trenching to an enormous depth, will, no doubt, be some day turned to good account. It has already been demonstrated that there are many localities, far up in the Sierra Nevada, better suited to the raising of many varieties of fruit, than the low, flat plains near the sea-coast.

Without adding anything further at present, your committee feel assured that every successive year, as it aids in developing the natural

resources of California, will also give larger and richer proofs of the suitableness and adaptability of her soil and climate, when knowledge and industry are properly applied, to produce abundance of all the varieties of fruit.

WM. DANIELS,	} Committee.
B. S. FOX,	
J. D. MOREY,	
L. A. GOULD,	
JAS. BELL,	
E. B. BATEMAN,	
J. L. BURTIS,	

PLANTS, FLOWERS, AND EVERGREENS.

The committee on plants, flowers, bouquets, etc., submit the following report :

The collection of pot plants, roses, bouquets, and dahlias, exhibited by Mr. James O'Donnell, of the United States Nursery, San Francisco, is fully entitled to the first premium for the following assortments, viz : the largest and best collection of pot plants, best one hundred and fifty varieties of roses, largest display of dahlias, two best vase bouquets, six best hand bouquets. We recommend a special premium of twenty-five dollars to Mr. O'Donnell, for his collection of native ornamental trees, many of which excel, in beauty and elegance, some of our European evergreen, ornamental trees and shrubs.

Your committee also award to M. S. Provost, of San José Nursery, second premium, for second best collection of roses. We would also award to L. Provost, first premium, for the best one hundred and fifty yards of floral wreath.

And your committee further recommend a special premium of ten dollars, to Mr. Myers, of Alameda, for a seedling geranium.

WM. F. BRYANT,	} Committee.
J. C. FALL,	

CURED MEATS, PRESERVES, &c.

The committee would respectfully make the following report upon the articles assigned them for examination :

No. 82.—Smoked hams ; best fifty pounds would be entitled to twenty dollars, but, as only one ham is on exhibition, we recommend a framed diploma. The ham was very fine, well and properly cured, and demonstrates, conclusively, that meats can be put up and cured in our climate, and be equal in quality to any in the world.

No. 7.—One jar dried apples, very fine ; diploma. One jar dried peaches, equal to any we ever saw ; diploma.

No. 49.—Two cases preserved peaches, in tin; diploma.

No. 33.—One dozen fresh peaches, in tin; diploma.

In closing our report, we regret that those interested in the two essential and leading articles of our state's wealth and commerce, should have neglected them, and trust it may never occur again. These articles enter largely into our consumption, and it has required an immense amount of capital to pay for their importation from abroad. The time has arrived when this, in a great measure, can be avoided. It is a fact, beyond controversy, that beef and pork can be cured in the climate of California, and compare favorably with that from any other portion of the world. We urge this matter, particularly, upon the attention of the public at large.

B. W. OWENS, }
V. M. PEYTON, } Committee.

NATIVE OILS, SYRUPS, DRUGS, CHEMICALS, &c.

The committee to whom was referred the duty of examining native hops, oils, extracts, essences, syrups, drugs, chemicals, pharmaceutical preparations, etc., would most respectfully submit the following report:

We have examined every article on exhibition, within our province, critically and carefully.

The first article your committee examined was a sample of tomato alcohol, partaking of the flavor of the fruit, but of very little strength; probably not more than from thirty-five to forty per cent. above proof. We think that a higher proof alcohol can be obtained from this garden vegetable.

We next examined a sample of rose water. This article the committee deemed of very indifferent quality.

The next article examined was a sample of alcohol derived from the pear. It is an excellent article, about seventy-five per cent. above proof. We could not find any name or number attached to the above articles, but believe them to be from one exhibitor; and as this is using products cheap and abundant, and therefrom producing articles of greater value, by home industry, we therefore, to encourage and stimulate all such attempts, award to the exhibitor a diploma, especially for the last named article.

Hops were the next article examined. To lot marked 23, a large and beautiful article, we award the first premium. To J. A. Hobart.

Next in order, we examined a jar of sal soda, beautifully crystallized, and as fine as any we ever saw. As this is an article in very common use, and as its manufacture should be encouraged, we award to its exhibitor a diploma.

Glass jar of powdered sage, Stockton growth, exhibited by Dr. S. M. McLean, is of very fine quality and flavor; and as all articles of this kind are better the more recent their growth, and as thousands of dollars are sent annually to the Atlantic states for this one article alone,

and wishing to do all that can be done to encourage its growth, we award to Dr. McLean a diploma.

We next examined a fine article of American saffron, Stockton growth, exhibited by Mr. S. H. Debnam.

Pharmaceutical preparations, chemicals, etc., from Little & Co., San Francisco, consisting of preparations of iron and quinine, amylene, pepsine, iodide of ethyle, glycerine, cod-liver oil, with quinine, syrup of iodide of iron, syrup of squill, chloroform, pills of the citrate of iron and quinine, and bay water. In regard to the last named article, we would state that it is manufactured from the native bay leaf, and although it is a very good article, it would be better if its extreme pungency could be somewhat lessened. To Little & Co., for general neatness and beauty of style of pharmaceutical preparations, etc., we award a framed diploma.

A sample of brandy and alcohol, obtained from the beet root, came next under the notice of the committee. The brandy is low proof, very fine and palatable, and we believe that, as a medicinal agent, it will prove to be as tonic for the use of the sick as any kind or grade of brandy known. The alcohol is ninety-five per cent. above proof, as strong as it can ever be imported; colorless, and fine in every respect. This is the best alcohol exhibited, and we award to Mr. Delessert, of San Francisco, a framed diploma.

We examined a collection of chemicals, pharmaceutical preparations, etc., from Dr. Lanzweert, San Francisco, consisting of powdered manganese, from native oxyd of manganese; crystallized sulphate of manganese, from the same; extracts, syrups, wines, tinctures of the canchagua, a native medicinal plant; also samples of the plant; lozenges, made from the solid ingredients of the justly celebrated Napa Springs; chlorid of lime, made from the common limestone of the state; tincture, extracts and powder of the huaco plant, tested in San Francisco in August last, and declared to be an infallible remedy for the cure of the bite of the rattlesnake; cinnabar, from the quicksilver mines; a beautiful sample of American vermilion, manufactured from the same; also some fine specimens of crystallized cinnabar, and California flea powder. To Dr. Lanzweert, for his fine collection of chemical and pharmaceutical preparations, we award a framed diploma.

A fine sample of flax seed, exhibited by Mr. Thomas Edwards, of Sacramento; the only sample on exhibition, and for which he obtained a premium in 1855.

Last of all, we examined a few of the principal preparations of the Turner Brothers, and Barbier—syrups, wines, bitters and essences—and we would award to the Turner Brothers the first premium, and to Barbier the second premium, for a fine exhibit of goods above mentioned.

We are aware that the articles presented, of indigenous plants and medicines, are fewer and much less important than should have been brought forward. The attention of botanists and pharmacutists can scarcely be said to have been directed to the development of the virtues of our native medicinal plants and minerals, and few authenticated experiments have been mentioned, or samples presented.

It can scarcely be doubted that, among the thousands of indigenous plants and minerals, there are many possessing healing powers unknown to the world.

A boundless field is therefore open to enterprising philanthropists to experiment, not only for the amelioration of human suffering, but for enrolling their names among the benefactors of mankind. And we suggest and hope, that not only physicians and druggists, but other citizens, in various parts of the state, will institute experiments of untested plants and minerals on the inferior animals, so that another year will show such an array of native medicines, of ascertained virtues, as will not only be flattering and gratifying to all Californians, but will claim the respect and admiration of other portions of the civilized world.

All which is most respectfully submitted.

J. L. POLHEMUS,	} Committee.
S. H. DEBNAM,	
G. W. WOOLLEY, M. D.,	

BUTTER AND CHEESE.

The committee to whom was referred the duty of examining butter and cheese, beg leave to submit the following:

On butter, the committee awards the first premium to No. 53, Mrs. J. F. Wood; second premium to No. 50, Mrs. H. M. Fanning.

Of cheese, there was but one lot offered for competition. Framed diploma awarded to E. Bent.

JOSEPH ARAM, Chairman.

DOMESTIC BREAD.

The committee to whom was referred the subject of domestic bread, ask leave to make the following report:

The bread before your committee numbered forty-five loaves, sent in by thirty-one contributors, and presenting as fair a show as was ever set before a hungry man; and your committee were called upon to notice all those features that go to constitute a loaf of *good* bread.

The flour of which the bread is made depends in a great degree upon the grain from which it is made, and also upon the manner in which that grain is ground and bolted.

The committee established a rule, in commencing their investigation, to reject all bread which contained butter, soda, saleratus, etc.; and this investigation was pursued until some five loaves were selected. From these were then selected the best, and thus the committee arrived at their awards.

The committee notice the prize was a silk dress, valued at fifty dollars. Presuming this character of prize was given without reflection,

and a silk dress, of fifty dollars, being so inconsistent in connection with a reward for pure domestic industry, the committee would hope that the prize may be changed to a piece of silver plate, which may be appropriately engraved, so that it may pass down as an heir-loom in a family that thus educates a daughter, at the early age of eleven years, to excel all other competitors in our state, and wear the great honor of making the *best bread in California*. Such a daughter does honor to her parentage and to the state, and her works hereafter will also further speak her praise.

A box of bread of very superior make was received too late—after the committee had closed their labors. It was so excellent that the committee commend it to the special notice of the executive committee.

The committee, in closing their duty, hope this first effort to awaken the community to the subject of good bread, may be followed by an increased interest, so that the next State Fair shall present hundreds of loaves of bread, all even of a superior character.

All of which is submitted on behalf of the committee.

JAMES L. L. F. WARREN

BEES.

The committee, through their chairman, beg leave to report that they have awarded the premium for the largest collection of bees to No. 21, Mr. Buck.

A. SHELL, Ch. Committee.

BLACKSMITH WORK.

The committee to examine blacksmith work respectfully submit the following report:

They decide that William Peaslee is entitled to the premium of ten dollars, for the best work, consisting of four mining picks.

They also recommend a diploma to Mr. La Bresh, for a superior sample of picks.

They also recommend a diploma to G. Dahl, for a fine sample of breast chains.

T. J. KEYS,	} Committee.
W. H. DERRICK,	
A. F. RANKIN,	
THOS. D. WELLS,	

BOOTS AND SHOES.

The committee appointed to examine and award the premiums for the

best specimens of boots and shoes, have attended to the same, and report as below :

They have awarded to No. 29 the Society's premium.

The committee are sorry to say that there was but one sample presented, and this was of questionable utility; it being a pair of fine, patent, opera boots. We would have been better pleased with samples of good substantial work, suited to the wants of the miner, farmer and mechanic—the real builders and supporters of California wealth and fame.

The importance of this branch of industry to California will be better understood, when the fact is taken into consideration that California needs for her consumption, annually, over three millions of dollars' worth of these articles. We award to F. Mabus, of Stockton, the first premium.

P. S. TIGG, } Committee.
L. MANN, }

A L E.

The committee to examine malt liquors, having tested the two qualities of ale offered for premium, do unanimously decide in favor of the Lion Company.

WM. DANIELS, } Committee.
A. D. NUDD, }
JAMES R. LOWE, }
J. W. ROGERS, }
JOHN H. KEELER, }

FIRE AND POWDER PROOF SAFES.

The committee selected to examine one alarm, fire and powder proof, wrought iron safe, manufactured by T. A. Auberlen and Herman Egbert, of San Francisco, beg leave to report:

That it possesses several merits which heretofore have not entered into the construction of fire proof safes, among which is the alarm bell. They would recommend that a framed diploma be awarded the manufacturers.

J. C. FALL, } Committee.
A. SHELL, }

MATHEMATICAL INSTRUMENTS.

We having been appointed a committee on surveying instruments, and having examined those now on exhibition, as practical engineers,

do pronounce a level, exhibited by Thomas Tennent, as a very fine instrument, and one that will favorably compare with any instrument, of the kind, in any state; and one that speaks favorably for the mechanical skill of its manufacturer; and we would recommend the awarding of a framed diploma to Thomas Tennent, of San Francisco.

GEO. E. DREW, }
C. D. GIBBES, } Committee.

GOLD PAN.

The undersigned committee would here report that they have, with pleasure, made an examination of a gold pan, exhibited by O. J. Backus, and would recommend, for the same, the first premium—framed diploma.

T. O. SHAW, }
S. WILLIAMS, } Committee.

LEATHER.

The committee on leather report that Joseph Boston, of San Francisco, exhibited the best sample of California made leather, and is entitled to the premium.

They also recommend, for some four specimens of black bridle leather, a diploma to Samuel Steine, of Stockton.

M. S. BIRD, }
MILES GEODMAN, } Committee.
CHARLES MANN, }

CONFECTIONERY.

Your committee on confectionery would recommend the first premium to sample No. 57. It consists of several superior qualities of differently scented candies, neatly wrought together. A second premium they would recommend to sample No. 48, which displayed neat workmanship, but the quality not so good. Allow us to add our regrets that the competitors were so few. Being ladies possessed of our due share of sugar teeth, we would gladly have tasted many a bon-bon, and recommended many a premium. We have the honor to be,

Mrs. LAWRY, }
Mrs. HEWLET, } Committee.
Miss L. BAGGS, }
Mrs. E. D. W. WITHINGTON, }

WIND MILLS.

Your committee on wind mills would here report in favor of No. 26, exhibited by Messrs. Hart & Derrick, of Stockton, as entitled to the first premium.

We would further recommend Dr. F. G. Johnson's wind mill; for all uses, where a wind mill is required.

C. GRATTAN,
WM. HICKS,
H. FORESMAN, } Committee.

HATS AND CAPS.

The committee appointed to examine specimens of hats, etc., would here report that they award the first premium for the manufacture of the best silk hats to Collins & Tiffeny, San Francisco. Framed diploma and five dollars.

They award the first premium for the manufacture of the best caps to M. Harris, San Francisco. Framed diploma and five dollars.

For a very superior dress hat, the committee award a framed diploma to A. Lamot, of Sacramento City.

O. H. BOYD, Committee.

BILLIARD TABLES.

We, the undersigned committee, appointed to report on billiard tables, respectfully beg leave to report as follows:

We find that Martin Bach, of San Francisco, has entered the only billiard table on exhibition. This table was designed by Mr. Bach, and made with his own hands, from native wood, in San Francisco. After examining this beautiful piece of home industry, the standing portion of which is on an entire new principle, having only five legs, one at each corner and one in the centre, for the purpose of regulating it, we agree in recommending the award of the premium offered, to Mr. Bach, notwithstanding the fact that he has no competitor, deeming the work and finish highly meritorious.

The cushions on this table are the celebrated patent cushions invented by Michael Phelan, of New York.

JN. C. REID,
R. K. REID,
GEORGE RYER, } Committee.

PIANO FORTES.

The committee have performed the duties assigned them, as far as

there was occasion. As there was but one piano on exhibition, they are not able to institute any comparison, and can only speak in general terms of the instrument entered.

The piano entered is a first class instrument, of the style called "semi-grand." Its compass is seven and three-quarters octaves. The bass strings are very heavy and long, and have a remarkably strong and rich tone. The upper strings run under those of the lower part of the scale, possessing two layers. This arrangement gives more room for the proper vibration of the strings, and for free movement of the action. The strain is thus also better distributed, and the liability to get out of tune diminished. This is the most modern construction of the scale, and is being adopted in all the best factories. The upper half of the scale is treble-stringed, and the tone is very full and brilliant. The iron frame is so braced in all directions as to give the greatest strength, and to be entirely above any liability to rupture. The case is of medium style, neither highly ornamented nor very plain. It presents an appearance in keeping with the character of the action and tone, being beyond criticism.

The committee would say, in conclusion, that this piano is fully equal to any that they have seen in the state, of foreign importation, and they believe, if there had been a dozen on exhibition, they would have been compelled to award the premium to this piano. It is exhibited by Mr. Zech, of San Francisco.

H. B. UNDERHILL,	} Committee.
Prof. SCHONBRUN,	
OTTO SUTRO,	

LETTER-PRESS PRINTING.

The committee on printing would report that they have discharged their duty, after a careful examination and mature deliberation, and award the first premium to Messrs. Whitton, Towne & Co., Excelsior Printing Office, 151 Clay street, San Francisco, they having the best samples of letter-press, book and job, card and fancy printing, on exhibition.

The committee would also represent that the samples on exhibition are superb—equal, if not superior, to the best "sample work" issued from the eastern press.

In view of these facts, we therefore award to Messrs. Whitton, Towne & Co., of San Francisco, a framed diploma, for the best sample of letter-press, book, job, card and fancy printing.

We also award a diploma to the "Alta California," for a sample of newspaper sheet, printed on satin, and bronzed, and placed in a beautiful frame.

B. F. KOOSEE,	} Committee.
L. A. HOLMES,	

DOMESTIC ROPE.

Your committee on rope have made their examination, and award the premium to No. 19, the only sample on exhibition. The manufacturers deserve much credit for the superior quality of their manufacture. We cannot refrain from calling attention to this one fact, that the manufacturers have already checked almost the entire importation of this article, and are enabled to furnish it at a much less price than the imported rope can be sold for. The raw material can be furnished in our market at as cheap a rate as in any of the eastern cities, thereby saving a heavy expense in freight, and giving to the laborer of our own state the profit.

The premium is awarded to No. 19, exhibited by Tubbs & Co., of San Francisco, it being a very fine article.

J. C. FALL,
J. D. MORLEY, } Committee.
A. W. BELL, }

DOMESTIC POTTERY.

The undersigned have examined the different lots of pottery exhibited at the State Agricultural Fair, and award the premium to lot No. 76, exhibited by Marcus Williams, of San José. The samples consisted of several pieces of fancy pottery, designed for flower pots and pillar ornaments. The texture was fine, remarkably free from coarse particles, with a firmness of adhesion well adapted to the manufacture of the larger articles of pottery in general use.

E. E. KENNY,
S. W. CUTTING, } Committee.
MOSES ELLIS, }

GRANITE WORK.

Your committee, to whom was referred the duty of examining granite work, beg leave to report that we regret that there is but one exhibitor in this department; yet this material exists in abundance in many parts of the state, so much so, that whenever granite is required, it is always supplied from our own native quarries.

The specimens before us are from the California Granite Company, on the American River, near Folsom, Sacramento County. There are three samples offered, all of which are plain wrought, without ornaments or moldings; but nevertheless, the fine and even surface cut upon them shows that the stone compares favorably with the celebrated Quincy granite, and, in our opinion, is in all respects suitable for any purpose for which the Quincy granite can be used.

The specimens are for building purposes, and are as follows: one win-

dow lintel, one plain piece of ashler, and one piece of rustic ashler; all of which are cut in workmanlike manner.

We therefore award them a diploma.

P. J. DEVINE, }
M. H. BOND, } Committee.
WM. SAUNDER, }

HARNESSES.

The committee on the best mule harness report that they find but one set presented, by M. L. Bird, of Stockton, a set for four mules, and to which we award the first premium. The leather and workmanship is of superior quality.

J. SARLES, }
SAM. MILLER, } Committee.
C. W. COOK, }

DENTISTRY.

The committee to examine specimens of dentistry would here report that they have examined some beautiful specimens, presented by Dr. D. Burbank. The artistical beauty of these specimens is very fine, and we would award the premium to No. 2, exhibited by Dr. D. Burbank.

A. SHELL, }
T. H. THOMPSON, } Committee.
H. E. WRIGHT, }

SPOKE-BORING MACHINE.

The undersigned committee have examined a spoke-boring machine, exhibited by John Mingos, and would report that they find it an excellent machine, and would recommend a diploma for the same.

S. WILLIAMS, }
T. O. SHAW, } Committee.

BRUSHES.

The undersigned, committee to examine brushes of home manufacture, would here report:

That they have made an examination of some fine samples, exhibited by Newman & Brothers, of San Francisco, and would recommend for the same, framed diploma.

JOHN MILLER, }
A. J. GAGE, } Committee.

TAILOR WORK.

The undersigned committee herewith report that we have examined the tailor work exhibited, and found one black coat, No. 28, to be the best coat, and the best made; and which, in our opinion, deserves the premium.

WM. WAYNE, } Committee.
T. GRABY, }

MARBLE WORK.

Your committee, to whom was referred the duty of examining specimens of marble work, beg leave to report:

That we have examined several specimens, from different contributors, consisting of a marble mantle-piece, and a grave-stone, by P. J. Devine & Bro., of Sacramento, of superior merit. The former, a mantle-piece, made of Italian marble, has great merit, as being a superb and appropriate piece of native sculpture, as well as its architectural design. The latter, a grave-stone, of native marble, designed in the Gothic style of architecture. The base, or plinth, is made of sand-stone, found on the Cosumnes River. The work does great credit to the artisans; we therefore award them the premium and a framed diploma.

Benedict & Roberts exhibit several specimens of Columbia marble, in plain blocks, and a monument. From the specimens before us, we think them worthy of note, and recommend that a diploma and fifteen dollars be awarded them, for the purpose of encouraging this branch of industry, for practical use.

Andrew Vinson, from Columbia, exhibits a square block of native marble, which is to be sent to Washington, to be placed in the national monument, by the miners of Columbia. It is remarkable for its solidity, and is susceptible of almost as high a polish as the Italian marble. From the same exhibitor, is also a soda fountain, of the same marble. Your committee recommend that he be awarded a special premium. All of which is respectfully submitted.

M. H. BOND, Chairman Committee.

We, the undersigned, being appointed a committee on native marble work, beg leave to make the following report:

That the samples of Columbia marble, on exhibition, were of superior workmanship, and the quality of the same very fine. We would recommend to Messrs. S. H. Benedict & Co., of Columbia, for a fine specimen of marble monument, a framed diploma and five dollars. Also, to P. J. Devine & Bro., of Sacramento, for a superior tomb stone, a diploma and five dollars.

M. H. BOND, } Committee.
T. J. STROUT, }
Dr. CHALMERS, }

STENCIL PLATES.

We, the undersigned, committee on stencil plates, beg leave to report the following :

That the stencil plates exhibited by J. F. Hall, are of superior workmanship, and are fully entitled to the first premium, a framed diploma.

J. WILLIAMS, } Committee.
A. J. GAGE, }

PAINTING.

The committee on painting would recommend the first premium for the best ornamental sign painting, to be awarded to Messrs. Hopps & Lougee ; and for the best specimens of imitation of wood and marble, to No. 58, Y. Robinson.

W. R. JEFFERSON, } Committee.
MILES STANDISH, }
S. S. SWASEY, }

MANUFACTURES.

The undersigned, committee on manufactures, would here report that they have examined a horse-power, exhibited by C. R. Conant, and would recommend it for the first premium, a framed diploma.

S. WILLIAMS, } Committee.
T. OGG SHAW, }

ARTIFICIAL FLOWERS.

The undersigned committee would here report that they have, with pleasure, made an examination of a sample of artificial flowers on exhibition, and consider them a very superior article. The samples were exhibited by Mrs. C. A. Mead ; and we would recommend, for the same, a premium of five dollars.

C. W. COOK, } Committee.
SAM'L MILLER, }

BROOM MACHINE.

The undersigned, committee on manufactures, would here report that they have with pleasure made an examination of a broom machine, made by John A. Wolf, San Francisco, on exhibition, and consider

it a superior article; and would recommend the same for the first premium, a framed diploma.

S. WILLIAMS, }
T. OGG SHAW, } Committee.

BROOMS.

We, the undersigned, have examined the different lots of brooms exhibited at the State Agricultural Fair, and award the premium to lot No. 80, exhibited by H. Lusk & Co., of San Francisco; and recommend, as a very superior article of home manufacture, the samples exhibited by E. D. Benson & Co., for a diploma.

LEWIS M. CUTTING, }
E. E. KENNEY, } Committee.
MOSES ELLIS, }

CABINET OF NATURAL HISTORY.

The committee to whom was assigned the duty of examining and reporting on "best cabinets of California natural history," beg leave to report that we have examined two cabinets, and would recommend that the premium be awarded to that belonging to the California Society of Natural History.

W. M. RYER, M. D., }
O. G. AULD, } Committee.
W. W. STEVENSON, }

STUFFED BIRDS.

The committee to whom was assigned the examination of "California birds, stuffed and mounted," beg leave to report, that after as careful an examination as the circumstances would admit, have decided that the three cases marked No. 1, Dr. E. S. Holden, in point of stuffing and mounting, possess a decided advantage, and recommend that the premium be awarded to that collection.

The cases marked No. 64, Dr. R. K. Reid, also present skill in preparing, and are peculiarly interesting and valuable, on account of the varieties.

C. D. GIBBES, }
WM. FORST, } Committee.
CHAS. THORN, }
W. M. RYER, M. D., }

FURNITURE.

The undersigned committee, appointed to examine samples of furniture manufactured in this state, report that they have made an examination of one entire set of parlor and chamber furniture, consisting of two tete-a-tetes, two arm chairs, eight parlor chairs, two ottomans, one attache, one bedstead, one bureau, one washstand, one sommo, and one wardrobe. The furniture was all made in San Francisco, of rosewood obtained on the Pacific coast. The style is elegant and chaste, and the workmanship of the first order. These samples of furniture, in quality of materials, workmanship and style, will do ample credit to the resources of the state, as well as to the enterprise and mechanical skill of the manufacturers.

C. I. HUTCHINSON,	} Committee.
O. H. MYERS,	
G. W. WOOLLEY,	
J. W. OWENS,	
W. H. LYONS,	

MINING IMPLEMENTS.

The committee to whom was referred the department of mining implements, respectfully submit the following awards:

First. To Mr. Diltz, for a model of a furnace for expelling the sulphur from auriferous pyrites of iron; framed diploma.

Second. A framed diploma, for a model of Howland's rotary quartz crusher.

Third. For a model of Morris' gold amalgamator; a framed diploma.

Fourth. To R. Gilchrist, for a model of a riffle box; a framed diploma.

Fifth. To Bryant & Co., a framed diploma, for hydraulic pipe.

Sixth. To E. A. Taylor, for a small model of Weaver's drop riffle box; twenty dollars.

Seventh. A model quartz amalgamator, by R. Gilchrist; diploma.

J. A. COLLINS, Chairman Committee.

CARRIAGE HARNESS.

The committee acting as judges on carriage harness, single harness, gentlemen's saddles, ladies' saddles, and finest bridle, report that they have examined all that are on exhibition, and have decided as follows:

Carriage Harness. None on exhibition of California manufacture.

No. 8.—Single buggy harness; Main & Winchester; prize.

No. 8.—Black riding bridle; Main & Winchester; prize.

No. 8.—Best gentleman's saddle, stamped covers; Main & Winchester; first prize.

No. 27.—Second best gentleman's saddle, silver pommel, and fouser; M. S. Bird.

No. 8.—Best lady's saddle, is one with fine stamped machilla, inside lined; Main & Winchester.

No. 27.—Second best lady's saddle, is one with buckskin seat, and stamped side-skirts. M. S. Bird.

All of which is respectfully submitted.

Q. H. PEIRCE, Chairman.

QUARTZ SPECIMENS.

The committee on quartz beg leave to make the following report:

Quartz specimens from Whitlock Creek, Mariposa county. This is a fine specimen of rock, rich; dimensions of claim or vein, four feet thick, and one hundred feet deep; owned by Goodman Diltz & Co.; first premium.

Quartz specimens from the Unión and Eureka vein. This vein is nine by fifteen feet in width, and from one hundred and fifty to two hundred feet in depth. This claim is rich, situate on Sutter Creek, in Amador County; special premium, ten dollars, and framed diploma.

Mount Gaines claim, situate in Mariposa County. This claim is owned by Mr. Collins; framed diploma.

Kern River vein, rotten quartz, supposed to be easily worked; framed diploma.

One collection from Mary Rose vein, Kern River; decomposed rock; framed diploma.

One collection of carbonate of copper; a very fine specimen; seventy-five miles from La Paz; diploma.

One exhibit of cinnabar or quicksilver ore, taken from the New Almaden mine; framed diploma.

One exhibit of lignite coal, from Alameda County; a good specimen; framed diploma.

One sample of silver ore, taken fifteen miles from La Paz; framed diploma.

The committee on quartz, owing to the limited space of time, was not able to make as thorough an investigation as this branch of mining was deserving. Many of the specimens on exhibition possessed uncommon richness and great value. Your committee are of the opinion that quartz mining will soon be the leading branch in gold mining in California. In our gold mountains there is a great amount of quartz rock, bearing gold; there will be no lack, for ages to come, and should thousands more people come from other lands, yet there will be no lack of gold in these golden hills.

All of which we most respectfully submit.

J. D. MORLEY,	} Committee.
H. C. HAMER,	
WM. RANEY,	
H. W. MORSE,	

UPHOLSTERY.

The undersigned committee, to examine upholstery, would here report that they have examined a specimen of hair mattress, exhibited by Jacob Schreiber, and would recommend for the same, as the best hair mattress, a diploma.

J. G. JENKINS, Committee.

DAGUERREOTYPES, &c.

The committee, who examined some beautiful specimens of art, award to R. H. Vance, of San Francisco, the first premium for the best samples of ambrotypes, photographs and daguerreotypes.

J. S. LOCK, } Committee.
G. AMBROSE, }

WAGONS AND CARRIAGES.

The committee on wagons and carriages beg leave to present this report:

The only pleasure carriages entered were trotting sulkeys, Number 69, entered by H. M. Barnard, on steel springs, very handsomely got up, and deemed entitled to the first premium of its class.

No. 37—Entered by E. L. How, upon wooden springs of very simple construction, but esteemed by your committee entitled to a first premium, of its class, on account of the novelty of the springs.

No. — —A one horse spring wagon, manufactured by J. L. Otten-ger, of San Francisco, of substantial make, and deemed entitled to a first premium of its class.

No. 57—A two horse, spring, express wagon, manufactured by Wm. Katner, of Stockton. This wagon commends itself, not only for its novelty, but particularly on account of its very superior smith work. It is entitled to the highest premium.

No. 60—A first class, good, substantial, farmer's family wagon, made by A. Rankin, with three seats, to be used with or without top; sits on leather braces, and is, in every respect, a first class carriage for service, and fully entitled to a first premium of its class.

No. 4—A four horse road or farm wagon, plain, substantial and good; entitled to a first premium of its class. This wagon was made by D. C. Mattison, of Stockton.

No. 43—Last but not least—a twelve horse wagon, weighing five thousand pounds, eighteen feet in length, on bottom twenty-two feet, on top six and a half feet in breadth, front wheels four and a half, and hind ones six feet in diameter; three inch axle, and will carry, with safety, twenty-four thousand pounds. This belongs to the class known, by teamsters, under the name of prairie schooners, constantly to be met

with in trading through the interior, and commanded by as hardy a looking set of men as ever plowed the briny deep. This wagon was built by Wm. P. Miller, of Stockton. It commends itself to the highest consideration of your committee, who recommend for it a first class premium, with diploma.

In closing this report your committee take great pleasure in commending, in the highest terms, the mechanical skill devoted to the manufacture of carriages and wagons, in all the varieties that have claimed their attention.

O. H. PENSUR,
W. F. BRYANT, } Committee.
JOHN P. NASH,

AGRICULTURAL IMPLEMENTS.

THRESHING MACHINE.

The only machine on exhibition is a model by Mr. Hoag, of Washington, Yolo County. This machine combines many advantages where the weight and length of straw is so great as found in this country. The sieves are greatly enlarged. The straw carriers are simple, easily adjusted; gearing simple, but very strong. Your committee cannot be expected to award a first premium on a mere model of a machine, but as Mr. Hoag's machine is really excellent, and adapted to our wants, we award a special premium.

HARVESTER AND THRESHER, COMBINED,

Is an ingenious model of this implement, by Mr. Vevill, of San Joaquin County, and shows one more step in inventive progress to this desirable result, while its real usefulness has yet to be tested. We award a diploma.

REAPING MACHINE,

By D. C. Mattison, of San Joaquin County, invented by Mr. Williams, of Stockton. Here the committee had the satisfaction of viewing a machine indeed labor-saving, combining the mower and reaper. Its weight is suspended on wheels of such size that while materially lessening the draft, a greater speed is safely admitted. The gearing is compact and strong, and your committee doubt not that this machine will, in a very short time, become exceedingly desirable and popular. We award a first premium.

MOWERS.

None were shown expressly for mowing, but as your committee deem that the same discretion which permits the throwing out articles not of absolute merit, also admits the extra premium in those of decided merit. We therefore award the first premium on mowers to the last named machine.

STEEL PLOWS.

There was more contest for premiums, in this article, than any other which came within the notice of your committee. Our manufacturers have, in these, done themselves and the state full credit, and where all possessed so much merit, decision became more difficult; and your committee wish to be distinctly understood that, in awarding premiums on these and all other articles, it is on the positive assurance, by the manufacturers, that they were wholly made in California, from the raw material, whether of home growth or in part.

Mr. Thomas Ogg Shaw, of San Francisco, shows a steel plow which excels in model, finish, and construction, and fitness for its proposed use. We award the first premium.

Mr. McDow, of San Francisco, exhibits a steel plow, in many points excellent, and appears a strong, light and serviceable implement. We award the second premium.

Mr. Marshall, of Sacramento, shows a steel plow of decided merit.—Diploma.

Mr. Mattison, of Stockton, shows steel plows, for two or four horses, of excellent model and finish, seemingly combining every requisite in common use, as also of that of a regulator to the depth, under heavy draft, doing away with the wheel in ordinary use. Diploma and special premium.

CAST PLOW.

Mr. Marshall, of Sacramento, shows a cast plow, with steel shear, known to the committee as a plow of excellent service in moderate depth of plowing. First premium.

GANG PLOWS.

Here, your committee, in the absence of actual trial, find it extremely difficult to pass upon the merits of implements, where all are so decidedly good.

The plow of Messrs. Marshall and Mattison is exceedingly well adapted to general work, in light or broken lands.

Mr. E. D. Curtiss shows a gang plow, with seed-sower attached. Your committee cannot express an opinion on a machine of this complication, without witnessing its operation; and would here respectfully call the attention of the executive to the importance of provision being made to give trial to implements of novel construction or improved manufacture.

Mr. E. D. Curtiss also shows a Scotch plow, with iron beam.

Mr. Shaw's plow is of higher finish and lighter construction; and will be of excellent service in orchard work, or where grain is plowed in; it turns thirty-four inches, is little likely to clog, can be gauged to depth, and is apparently light of draft.

We award to Mr. Marshall, of Sacramento, first premium.

Mr. Mattison, of Stockton; diploma.

Mr. Shaw, of San Francisco; diploma.

SUB-SOIL PLOWS.

Two implements, only, were shown in competition for the first premium. That of Mr. Gould, of Santa Clara, is ingenious, and may be valuable in sandy lands, and for orchard work.

Mr. Thos. O. Shaw, of San Francisco, shows a sub-soil plow, of novel construction, and susceptible of use for varied purposes, in lightening up potato, corn, and orchard lands, with comparative saving of draft and labor. We think this will be found a valuable implement, and award first premium.

FANNING MILL.

A strong, serviceable mill, containing some novelties and improvements in construction, adding to strength and usefulness, was shown by Mr. Thos. Ogg Shaw. First premium.

HARROWS.

Mr. Shaw, of San Francisco, shows a harrow, containing sundry excellences, apparently as complete as this instrument has as yet been made. First premium.

Mr. Mattison, of Stockton, shows another variety of the Scotch, square harrow, heavy, and intended for use in strong lands, excellent in its construction. Second premium.

CHURN.

Mr. Thos. Ogg Shaw, of San Francisco; first premium.

BUTTER-WORKER AND CHURN, COMBINED.

This is the only article of the kind exhibited. The invention, we think, is original. We award to J. L. Atkins, of Sacramento, first premium.

CHEESE PRESS.

H. McNally, San Francisco, first premium.

GARDEN. WHEELBARROW.

Only one on exhibition. We award to D. C. Mattison, Stockton, first premium.

CULTIVATOR.

For orchard and garden work, a tool is shown by Mr. Mattison, of Stockton, useful and valuable where a disturbance of surface equal to light plowing is desired. First premium.

VOLUNTEER CULTIVATORS.

A strong, serviceable implement, is shown by Mr. Mattison, of Stockton. This massive implement requires a strong farm fence, and doubtless, on land plowed late the preceding year, will be a most effectual labor-saving implement. It spans seven feet; depth and resistance gauged by wheels and brakes. First premium.

Mr. E. H. Comstock, farmer, of San Joaquin County, shows an implement of lighter but similar construction to that of Mr. Mattison, to which he has made some additions and improvements; his gauge-wheels are also rollers to level the furrows made by the cultivator teeth.

Your committee were much pleased with an implement manufactured by the man who desired its use, and hope our farmers, in many cases, will show a like ingenuity in the adaptation of implements which so varied a soil and climate require. We award Mr. Comstock a special premium and diploma.

GRAIN FORKS.

Some forks for the taking up of unbound grain, of excellent and strong material and construction, shown by Mr. Mattison, of Stockton. First premium.

MODEL OF A WATER ELEVATOR; ALSO, MODEL SELF FARM GATE,

Shown by Mr. J. Perkins, of San Francisco; of much ingenuity, and if in practice as successful as in model, will be valuable where water is scarce and fencing is expensive.

IMPORTED AGRICULTURAL TOOLS.

We particularly notice the Boston steel clipper plows, X4½ and X8, from Messrs. Treadwell & Co., of San Francisco; shown by J. L. Palmer. X4½ is a breaking plow for lap furrow, has coulter and wheel, turns thirteen inches. X8 is a stubble plow, turns twelve inches, and weighs seventy-three pounds.

These plows are of desirable pattern, and a great addition to our agricultural implements; and as the importer of choice farm tools is a benefactor to the farming interests, second only to the inventor and manufacturer here, we award diploma.

Thos. Ogg Shaw, of San Francisco, shows a portable cider and grape mill, decidedly valuable, and just the implement to meet a want each year increasing in a ten fold ratio. Diploma.

Mr. Shaw also shows hoes, potato forks, barley forks, scythes and snaths, corn sheller, self-acting cheese press, a circular straw table, an improved farm gate; all good, some excellent. Diploma.

Messrs. Hewlett & Collins, of Stockton, show an importation, manufactured to their order, of Boston steel clipper plows, X½, X4, X8, with wheel and coulter, for two or three horses. These plows have an improvement in length and strength of beam, securing a much greater steadiness of draft and easier application of power. They also show mowing machine, fanning mill, Scotch harrow, cast and steel plows, straw cutters, ox bows, corn shellers, and other articles. The best and the largest show of imported tools. We award a diploma.

H. McNally, of San Francisco, shows a cornstalk and sugar-cane cutter.

GRAIN DRILLS.

Your committee note the exhibition of imported grain drills with

peculiar pleasure. We have, at last, something better than the worthless tools thrown aside years since in other states. There are now offered implements worthy of a California farmer's use, whose more general introduction and use will effect a saving of thousands in our seed and labor.

Messrs. Hoag, of Washington, Yolo County, show Bickford & Huffman's drill, known to the committee to be an excellent implement of economical use, suitable either for planting or broadcast sowing. In the introduction, Mr. Hoag has done our farmers a valuable service. Diploma.

Thos. Ogg Shaw shows a Palmer drill, simple, strong, light; spans seven feet, and is apparently a desirable implement for sowing broadcast or in drills.

W. G. Griffith shows a grain drill, with seed sower attached. This drill is more complicated than the last two mentioned, and is also adapted to spreading grain or lime.

WILLOW BASKETS.

Neither manufactured nor imported were exhibited. Your committee take leave to call attention to this manufacture, for which the demand is constantly increasing.

HORSE POWER.

A horse power for two horses, exhibited by Mr. Conant, of Stockton, simple, and of easy application to many of the lighter matters of farm labor, for drawing water, cleaning grain, sawing wood, chopping feed, etc., etc.

J. W. OSBORN,	} Committee.
WM. GRAHAM,	
JAS. FROST,	
S. W. COLLINS,	
G. W. SWEEZEY,	

BEST RIDER.

The rancheros' purse, for the best rider of a wild horse, fifty dollars, is awarded to J. C. Glean.

J. W. O'NEAL, Chairman Committee.

PIE MELON.

We, the undersigned committee, beg leave to report the following:

That we consider the pie melons of superior quality, and would recommend a framed diploma, for the same, to G. C. Yount, of Napa, as the first premium.

D. J. STAPLES,	} Committee.
R. S. BATES,	

MALT.

The undersigned committee would report :

That they have, with pleasure, made an examination of a lot of malt, on exhibition, and consider it a very superior article. The sample exhibited was from the Pioneer Malt House, of Lewis S. Ford, and we would recommend the same for the first premium, a framed diploma.

S. WILLIAMS, } Committee.
S. T. NYE, }

SUGAR, SALT, STARCH, &c.

The committee chosen to judge of the following articles, viz : refined sugar ; California salt ; sugar, from Chinese sugar cane ; sugar, manufactured from any California product, promising to be profitable ; California starch, whether manufactured from potatoes or wheat ; mustard, spices, etc., prepared from California products ; honey ; lard ; soap ; oil ; vermicelli ; maccaroni ; etc., beg leave to submit their report, as follows :

Of sugar, manufactured from Chinese sugar cane, there was no sample on exhibition. The only sample of refined sugar was from the San Francisco Sugar Refinery Co., which is consequently entitled to the premium. They had on exhibition samples of coffee-crushed, granulated, powdered, crushed and loaf sugars, of superior quality, and, in our estimation, fully equal to any imported from the eastern cities.

In salt, there was no competition, the only sample exhibited being that marked No. 4, Boom & Greenwood, which, we would remark, is of excellent quality.

The premium for the best fifty pounds of sugar, manufactured from California products, is awarded to Mons. Eugene Delessert, of San Francisco, whose exhibit of sugar, of different varieties, manufactured from the sugar beet, we regard as one of the most important and interesting features of the whole exhibition. We examined eight different grades of sugar, manufactured from beets raised from seed which arrived in the country only four months since. Mons. D. has labored under great disadvantages, from the imperfect machinery he has been obliged to use in the manufacturing and refining process ; but, notwithstanding these difficulties, he has succeeded in producing an article, which, in every respect, will compare favorably with the best imported from abroad. Sugar manufactured from the beet is extensively used in France, Germany, Austria, and other European countries. It has been demonstrated by actual experiment, that our soil and climate are admirably adapted to the growth of this species of beet, three crops of which can be easily raised in one year, and one acre yielding, as we are informed by good authority, from forty-five to fifty tons. We learn, further, that the capital required for manufacturing is very small, in comparison with that for sugar cane. We regret that we have neither space nor time to enter more fully into detail, but we are satisfied that all the sugar required

for consumption in this state can be supplied from this source. In view, therefore, of the immense saving that would ensue to the state, by the production at home of so important an article, and the great source of wealth that would thus be opened, we feel that we cannot too earnestly recommend the subject to the consideration of the people of California.

For the best exhibit of mustard, spices, etc., prepared from California products, the premium is awarded to H. C. Hudson, for his Golden California Mustard. We must express our regret that the condition that the spices should be manufactured from California products, excludes from competition the splendid assortment of spices and coffee exhibited by Messrs. Wm. H. Bovee & Co., of San Francisco. From our examination of their specimens we can, without hesitation, pronounce them, both in reference to quality and style of package, far superior to any imported article. We can state, of our personal knowledge, having been most of us acquainted with the firm for some years past, that this enterprising firm, from the great excellence of their articles and the low price at which they have uniformly sold, have succeeded in a great measure in checking the foreign importation. The article of ground coffee, alone, which a few years ago was shipped to us from the east, they now supply, to the almost fabulous amount of one hundred thousand pounds per month. In consideration, therefore, of the great saving thus secured to the state, not only in the amount of labor employed, but the consumption of lumber and other state products required in the prosecution of their business, your committee would recommend that a special premium be awarded.

We found but two specimens of honey, and have awarded the premium to No. 84, Wm. Buck.

Best exhibit of soap, No. 16; S. P. Dyer.

No. 41 comprises a splendid assortment of sperm, polar, black-fish, seal, solar, coast, and tanners' oil, from R. F. Knox & Co., San Francisco, to whom the premium is awarded. Although no premium has been offered for the article, we would call your attention to a fine specimen of sal soda, from the same firm, and recommend that a diploma be awarded.

The premium for the best sample of macaroni is awarded to No. 5. For the best sample of vermicelli, to the same party. In this, as well as in many other articles that enter largely into consumption, your committee is pleased to notice the high degree of perfection to which our manufactures have arrived.

In taking a survey of all the interesting and useful articles on exhibition, every one who feels an interest in the prosperity of our young and growing state, must be gratified to observe the rapid progress that has been made, and encouraged to hope that the hard-earned gold that is now carried off by every steamer, will remain to enrich our own citizens and not the foreign speculator.

H. T. COMPTON, V. M. PRYTON, JOSEPH ARAM, JNO. C. FALL, PRESTON MORRIS,	}	Committee.
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TOBACCO AND CIGARS.

The committee on manufactured tobacco and California-made cigars, find none of the former, and but one sample of the latter.

The samples examined by us were found, in workmanship, equal to the best Cuba cigars, and with age would be a very superior article. They are supposed to have been made of native material, though we have never met with native tobacco of equal flavor to the material of which these cigars are made. By proper attention, however, it is believed by good judges that our soil and climate are well adapted to the growth and cultivation of the best varieties for the manufacture of cigars, which would equal the best Havana, and we may hope, at no very distant day, that we may add tobacco and cigars to our native growths and manufactures.

M. WALTHALL, } Committee.
W. DANIELS, }

NATIVE WINES, &c.

The committee on native wines award to Sansevaine Brothers a framed diploma, for the best white wine, manufactured from grapes grown in California, of the vintage of 1842. It is considered by your committee the most superior wine on exhibition, and entitled to the first premium.

Also, a framed diploma to Kohler & Frohling, for a superior article of port wine, manufactured from California grown grapes, of the vintage of 1856. It is considered worthy of special notice, and superior to any imported wine of the same variety.

Angelica, sweet wine, exhibited by Kohler & Frohling and Sansevaine Brothers; considered of fair quality; resembling native Muscatel, or Sicily wine, and is much esteemed by the native California population.

Claret.—A splendid sample of this kind of wine was exhibited, without name or label. It was considered by your committee, and other competent judges, as far superior to any claret imported from France or Italy.

No. 19.—S. W. Halsee, of Los Angeles, exhibited a keg of native wine, of the vintage of the present year, 1857, only six weeks old. It is considered pure juice, of high flavor, resembling Malaga—a dessert wine of superior quality, and will improve by age. It is highly exhilarating, but deprived of that acrid property which produces head-ache. Your committee deem the manufacturer entitled to a framed diploma, or a special premium, and would call the attention of wine growers to his article, herewith appended, on the method of making pure wine.

Of currant wine, only one sample was exhibited. It was considered of a superior quality and excellent flavor. To the manufacturers is awarded a premium of ten dollars. No. 18.—Thompson & Co., Suscal Ranch Nursery, Napa County.

Specimens of brandy were also exhibited to the committee, manufactured from the grape, from the pear, and from the beet. The latter is

considered worthy the special attention of the agriculturists and manufacturers of California. The brandy is made from the residue and foam of the beet, after the beet itself has been converted into sugar. It can be afforded at forty cents per gallon. The manufacturer is Eugene Delessert, of San Francisco, and is entitled to a diploma from your society.

Alcohol, manufactured from the pear, the tomato and the beet, was also exhibited. The different specimens were all of good quality and strength, and considered worthy of encouragement and attention, and can be produced cheaply, for use in arts and manufactures.

ROBT. K. REID,	} Committee.
J. C. COBB,	
EUG. DELESSERT,	
HORACE WEBSTER,	
THOS. W. SEELY,	
J. D. WATSON,	

NATURAL SODA WATER.

The committee to whom was referred the natural soda water from the Mountain Springs of Napa, report the analysis of said water from the different springs, as made by an eminent chemist, Dr. Lanszweert, of San Francisco:

Residuum from Evaporation, in one quart, in grains.	Crystal Spring.	Rock Spring.	Soda Spring.
Bicarbonate soda.....	3.20.....	3.22.....	3.28
Carbonate magnesia.....	6.45.....	6.50.....	6.53
Carbonate of lime.....	2.65.....	2.68.....	2.72
Chlorid of sodium.....	1.32.....	1.33.....	1.30
Sub-carbonate of iron.....	1.05.....	1.98.....	1.16
Sulphate of soda.....	0.42.....	0.40.....	0.46
Sulphate of lime.....	0.30.....	0.33.....	0.00
Phosphate of soda.....	0.39.....	0.50.....	0.00
Silicious acid.....	0.85.....	1.02.....	0.17
Alumina.....	0.23.....	0.23.....	0.15
Loss.....	0.58.....	0.68.....	0.62
Solids in one quart—grains.....	17.44.....	18.87.....	16.39
Temperature, Fahrenheit.....	64.4.....	66.2.....	68

These springs are situated on the side of a mountain, about five miles from Napa City, in Napa County. They are on the eastern side of the valley. At no distant day they are destined to become a favorite resort for the sick and afflicted, as well as for the wealth and fashion of the state. The water is now bottled in a superior manner, and by an entirely new process. From the moment the water issues from the rock, until it is safely corked in the bottle, it does not come in contact with

atmospheric air, so that none of its properties can by any possibility be lost. It is then transported and offered for sale in the different cities of the state. Messrs. Buckman & Allen are the proprietors.

ROBT. K. REID, }
C. W. NORCOM, } Committee.

ESSAYS.

The committee appointed by the State Agricultural Society, to examine essays, beg leave to report that they have given much time to, and have perused carefully the essays submitted, and find all of them possessing much merit.

The essay on alkaline soil, by William Thompson, is a work of much thought and study, and full of interesting information—the author treating elaborately on alkaline soil, tule lands, and salt marshes, and extending his research to plants, vegetables, etc. It is a production of much merit, and will be read with interest by the agricultural community of our young and growing state.

Your committee would recommend the essay, by William Thompson, for the first premium.

The essay of William Simpson is entitled to the favorable consideration of the executive committee.

The essays on gophers and squirrels, in which some excellent ideas are offered, your committee would class as follows: that of John Streutzel, No. 1; Michael McCartnay, No. 2; L. K. Chalmers, No. 3.

The essay on quartz mining, by Frank Cone, is worthy of your consideration—the author having gone fully into the present modes by which quartz mines are worked. It is to be regretted that there is no competition on this important subject, as the author of the essay submitted does not advance any new ideas. Quartz mining is of so much importance to the interest of our state, your committee recommend that the officers elect of the State Agricultural Society offer more liberal inducements for essays on that branch of mining, by which, without doubt, new suggestions would offer. All of which is respectfully submitted.

SAMUEL PURDY, }
C. M. HITCHCOCK, } Committee.

LIST OF PREMIUMS

AWARDED TO EXHIBITORS AT THE FOURTH AGRICULTURAL FAIR
AND CATTLE SHOW, HELD IN STOCKTON, SEPTEMBER, 1887.

FARMS, ORCHARDS, NURSERIES, VINEYARDS, AND FIELD CROPS.

Best improved grain farm...framed diploma and fifty dollars...E. H. Comstock, San Joaquin.

Second best do...twenty-five dollars...V. M. Peyton, San Joaquin.

[The awarding committee deem it proper to state that the above farms were the only ones entered for premiums.]

Best vineyard...framed diploma and thirty dollars...J. A. Sutter, Hock Farm.

Second best do...twenty dollars...B. D. Wilson, Los Angeles.

Best nursery, (three hundred and fifty-four thousand trees)...framed diploma and thirty dollars...Wilson Flint, Alameda.

Second best do...twenty dollars...J. Lewelling, Alameda.

Best mountain orchard and nursery...framed diploma...Garcelon & Kellenbech, Calaveras.

Best orchard...framed diploma and thirty dollars...L. B. Lathrop, San José.

Second best do...plate, value twenty dollars...G. H. Beach, Marysville.

Superior orchard...framed diploma...Mr. Thompson, Suscol Nursery.

Best kitchen garden...framed diploma and plate, value fifteen dollars...A. P. Smith, Sacramento.

Second best do...ten dollars...Maj. Bidwell, Butte.

Best flower garden...framed diploma and fifteen dollars...Wm. O'Donnell, San José.

Second best do...ten dollars...W. C. Walker, San Francisco.

Best nursery of five thousand timber trees...plate, value twenty-five dollars...A. P. Smith, Sacramento.

Second best do. of three thousand timber trees...plate, value fifteen dollars...G. H. Beach, Marysville.

Best nursery of hedge plants...plate, value twenty dollars...A. P. Smith, Sacramento.

Second best do...ten dollars...L. Prevost, San José.

- Best hedge fence of native plants...plate, value twenty-five dollars...A. P. Smith, Sacramento.
- Best hedge fence...twenty dollars...L. Bertise, Santa Clara.
- Second best do...ten dollars...J. Lewelling, Alameda.
- Best one hundred basket-willow trees...framed diploma...A. Delmas, San José.
- Best arranged and largest green-house...framed diploma...A. P. Smith, Sacramento.
- Second best do...diploma...W. C. Walker, San Francisco.
- Best nursery of seedling peach trees, (five hundred and fifty thousand,...)framed diploma...A. H. Myers, Alameda.
- Best nursery of seedling fig trees, (five thousand,...)framed diploma...A. H. Myers, Alameda.
- Best nursery of one year old apple trees...framed diploma...P. T. Adams, San José.
- Fine nursery fruit trees...framed diploma...Smith & Winchell, San José.
- Best nursery orange trees, (one thousand,...)framed diploma...George Lee, Oakland.
- Best nursery English walnut trees, (five thousand,...)framed diploma...J. Aram, San José.
- Best strawberry field, eighteen acres...framed diploma...Wolf & Lusk, Oakland.
- Best raspberry field, four acres...framed diploma...White & Kelsey, Oakland.
- Best garden seeds, (four tons,) raised this year...framed diploma...A. P. Smith, Sacramento.
- Best growth and variety of fruit and ornamental trees, grown on the smallest space of ground...framed diploma...J. R. Low, San José.
- Best orchard dwarf apple trees, (one thousand and sixty,) two years old, from root graft...framed diploma...Mr. Fountain, Oakland.
- Best two acres peanuts...framed diploma...Dr. Curtis, Yolo.
- Best ten acres wheat...first premium, forty dollars...John Grattan, San Joaquin.
- Best ten acres barley...first premium, forty dollars...C. J. Leach, San Joaquin.
- Sample of superior barley...special premium...Mr. Wagner, Stanislaus.
- Sample of rye...diploma...Ernest Lodtman.
- Best acre of corn, yield one hundred and nine bushels...first premium, thirty dollars...L. G. Lyons, Ione Valley.
- Best sample of corn...special premium...A. F. Potter, Ione Valley.
- Best acre of potatoes...special premium, twenty dollars...T. B. Parker, Mokelumne River.
- Best acre of onions...special premium, twenty dollars...J. C. Tyler, San Joaquin.

- Sample of California timothy...special premium...Wm. M. Williams, San Joaquin.
- Sample of wild clover...special premium...Jacob Haflich, San Joaquin.
- Best exhibit of malt...diploma...L. S. Ford, Pioneer Malt House, San Francisco.
- Best sample of rice oats...diploma...Ling & Co.
- Best sample of native cotton...framed diploma...Mr. Gibson.
- Best acre of tobacco...fifty dollars...T. A. Gorey and J. C. Renfold, El Monte, Los Angeles.
- Best acre of hemp...fifty dollars...J. B. Manning, San José.
- Best acre of sugar cane...fifty dollars...Mr. Borham, Los Angeles.
- Best acre of alfalfa...fifty dollars...Pinnex & Cameron, Marysville.
- Best half acre Chinese sugar cane...twenty-five dollars...L. A. Gould, Santa Clara.

HORSES, MULES, ASSES, CATTLE AND SHEEP.

- Best stallion, bay stallion "Rattler," five years old...one hundred dollars and framed diploma...Mr. Werner, Sacramento.
- Second do., bay stallion "Lawyer," five years old...fifty dollars...Wm. Hood, Sonoma.
- Best American bred mare, "Betsey Dennis"...framed diploma and fifty dollars...W. M. Williamson, Santa Clara.
- Second do., "Betsey"...twenty-five dollars...J. E. Clements, San Joaquin.
- Third do., bay mare "Fair"...diploma...John Pairai.
- Best California bred stallion, bay colt, four years old...fifty dollars...Mr. Burrows, San Joaquin.
- Second do., chestnut stallion "Felix," four years old...twenty-five dollars...E. C. Kelty, Stockton.
- Special premium of framed diploma to three years old stallion "Winfield Scott," owned by Stowel Cady, Stanislaus River.
- Best three years old colt, bay stallion...thirty dollars...Trahern & McMullen, San Joaquin.
- Special premium to bay stallion "Ariel," five years old, owned by C. J. Leach, San Joaquin.
- Best California bred mare, "Cornelia Terry"...twenty-five dollars...B. F. Langford, San Joaquin.
- Best brood mare and colt, "Jeannett"...twenty-five dollars...Wm. Flagg, Stanislaus River.
- Second do., "Mary"...fifteen dollars...J. E. Clements, San Joaquin.
- Third do...diploma...E. S. Lathrop.
- Fourth do., "Dolly"...diploma...Mr. Prather, San Joaquin.

Special diplomas were awarded as certificates of exhibition, to the following horses: "California Traveler," owned by B. White, San Joaquin; "Salem," Suthers & Covey, Stanislaus; "Castle," D. Porter, Stockton; "Lucky Bill," D. C. Fugitt, San Joaquin; "Billy Berkshire," J. B. Damerell, San Joaquin; filly "Jane," V. S. Rogers, San Joaquin; "Granny," A. McCloud, Stockton; "Fanny," J. E. Clements, San Joaquin; filly "Cola," A. McCloud, Stockton; "Desdemona," Trahern & McMullen, San Joaquin; "Orphan," Trahern & McMullen; "Alice Rodgers," W. F. McDermott, San Joaquin.

Best year old colt, "Lorenzo Dow"...twenty dollars...J. B. Damerill.

Second best do., "Yellow Boy"...framed diploma...W. F. McDermott, San Joaquin.

Best pair carriage horses, a pair of sorrel horses...first premium, twenty-five dollars and framed diploma...Dr. E. S. Holden, Stockton.

Exhibit of carriage horses...framed diploma...Wm. Reynolds.

Best jack...seventy-five dollars...Wm. Hicks, Sacramento County.

Second do...twenty-five dollars...Mr. Hicks.

For best mule team...forty dollars...C. H. Huffman, Stockton.

Best pair draught mules...twenty dollars...C. H. Huffman.

Second do...ten dollars...C. H. Huffman.

Best bull, "John"...one hundred dollars...Wm. Hicks, Sacramento.

Best two years old bull, red and white short horned Durham, "Orion"...twenty-five dollars...Geo. H. Howard, San Mateo.

Best yearling bull...fifteen dollars...J. Sarles, San Joaquin.

Best cow...fifty dollars...Wm. Hicks, Sacramento.

Second best do...twenty-five dollars...C. W. Bradford, San Joaquin.

Best two years old short horned Durham heifer, "Lady Hopeful"...twenty-five dollars...G. H. Howard, San Mateo.

Best calf, bull calf "Calaveras"...twenty dollars...C. W. Bradford, San Joaquin.

Second best...ten dollars...Rothenbush & Umlauff, San Joaquin.

Best fat bullock...twenty-five dollars...Henry Bachman, San Joaquin.

Second best do...fifteen dollars...Henry Bachman.

Best milch cow...twenty dollars...Peter Rothenbush, San Joaquin.

Best buck, imported French merino, "Napoleon"...twenty-five dollars...Searle & Winn, Solano.

Second best do...fifteen dollars...James Shepard, Santa Clara.

Best ewe and lamb...ten dollars...Searle & Winn, Solano.

SWINE.

Best boar...twenty dollars...C. D. Benjamin, San Joaquin.

Best pair fat swine...twenty dollars...C. T. Meader, Stockton.

Best breeding sow...ten dollars...C. D. Benjamin, Stockton.

- Best pair of hogs...special premium, ten dollars...C. A. Mead, San Joaquin.
 Best fat hog...ten dollars...Moses Savory, Stockton.
 Best three fowls, (cock and pair of hens,)...ten dollars...Long & Bro., Alameda.

FLORAL.

- Best display of pot plants...twenty-five dollars...James O'Donnell, U. S. Nursery, San Francisco. Best collection of roses, (one hundred and fifty varieties,)...ten dollars; best collection of dahlias...ten dollars; best pair of rose bouquets...ten dollars; best six hand bouquets...ten dollars; best collection of native ornamental trees...twenty-five dollars.
 Second best roses...five dollars...L. Prevost, San José Nursery.
 Best floral wreath...twenty-five dollars...L. Prevost, San José Nursery.
 Seedling geranium...ten dollars...A. H. Myers, Alameda.
 Best evergreen wreath...twenty-five dollars...L. Prevost.
 Best design and decoration...twenty-five dollars...James R. Lowe.

FRUIT.

- Best and largest pears, eight varieties...fifteen dollars...M. Delmas.
 Second best do., nine varieties...silver plate, value ten dollars...A. P. Smith, Sacramento.
 Fine exhibit of pears, seven varieties...diploma...J. L. Sanford, Alameda.
 Do. do., five varieties...diploma...J. Aram.
 Do. do., five varieties...diploma...S. J. Hensley.
 Exhibit of second crop of pears, two varieties...diploma...Wm. Daniels.
 Fine exhibit of pears, four varieties...framed diploma...A. B. Thornburg, Santa Clara.
 Do. do., five varieties...diploma...M. Pellier.
 Do. do., four varieties...diploma...S. Thompson.
 Best specimens and largest variety of apples, thirty-five varieties...fifteen dollars...Joseph Aram, Santa Clara.
 Second best and largest variety of apples, thirty-eight varieties...ten dollars...A. B. Thornburg, Santa Clara.
 Framed diplomas were awarded to the following gentlemen, for fine collections of apples: E. W. Case, twenty-seven varieties; S. Thompson, Suscol, thirty-four varieties; A. H. Myers, eighteen varieties; John Lewelling, thirty-eight varieties; C. Peebles, eight varieties; L. H. Bascom, seventeen varieties; C. T. Ryland, ten varieties; L. Prevost, six varieties, and one of pear; Dr. Caldwell, twelve varieties.
 Best and largest variety of peaches, nine varieties...fifteen dollars...John Peneira.

- Fine exhibit of peaches...diploma...Chas. A. Potter.
- Best specimens of quinoes, two varieties...twenty dollars...J. Aram.
- Second best do...ten dollars...James Lick.
- Best exhibit of foreign grapes, thirty varieties...twenty-five dollars...
Mr. Delmas.
- Second best do., six varieties...fifteen dollars...Van Temps.
- Best exhibit of California grapes...ten dollars...J. Rowland.
- Second best do...five dollars...L. A. Gould.
- Exhibit of California grapes...framed diploma...Kohler & Frohling.
- Do. do...diploma...J. R. Covey.
- Foreign grapes, very fine, twelve varieties, green-house and out-door
culture...framed diploma...F. W. Macondray.
- Grapes, nine varieties, open culture...framed diploma...A. P. Smith.
- Grapes, very fine...framed diploma...W. Wordsworth.
- Foreign grapes, very fine, twelve varieties...framed diploma...C. M.
Weber.
- Painting of six varieties of peaches...framed diploma...A. H. Myers.
- Best exhibit of strawberries, six varieties...ten dollars...Mr. Sanford,
Alameda.
- Exhibit of early peaches, in jars, thirteen varieties...plate, value fif-
teen dollars...A. P. Smith, Sacramento.
- Exhibit of early peaches, one variety...framed diploma...Angelo Oliva,
Stockton.
- Do. do., two varieties...framed diploma...E. B. Bateman, Stockton.
- Best specimens of apricots, four varieties...fifteen dollars...S. Thompson,
Suscol Nursery.
- Very fine exhibit of apricots...framed diploma...Angelo Oliva, Stockton.
- Apricots, in jars...framed diploma...J. Aram.
- Best nectarines, five varieties...ten dollars...S. Thompson, Suscol Nur-
sery.
- Seedling do...framed diploma...A. P. Smith.
- Best exhibit of plums, in jars, five varieties...fifteen dollars...Thompson,
of Suscol.
- One jar plums...special premium...J. Aram.
- Best specimens of cherries, nine jars...fifteen dollars...S. Thompson, of
Suscol.
- Best exhibit of gooseberries, eight jars...framed diploma...Thompson,
of Suscol.
- Second best do...diploma...Dr. E. B. Bateman, Stockton.
- Best exhibit of currants, five jars...framed diploma...Thompson, of
Suscol.
- Best exhibit of dried apples and peaches...framed diploma...Thompson,
of Suscol.

Best exhibit of pomegranates...twenty dollars...S. J. Hensley.
 Best specimens of soft shell almonds...framed diploma...Geo. H. Beach,
 Marysville.

VEGETABLES.

Best six squashes...ten dollars...Jacob Doughty, Sacramento River.
 Second best do...five dollars...John G. Allman.
 Best exhibit of onions...ten dollars...A. Runion, Sacramento River.
 Second best do...five dollars...J. Hale, Stockton.
 Best bushel sweet potatoes...five dollars...S. C. Tyler.
 Best bushel potatoes, "Pink-eyes"...five dollars...Wood & Davis, Sac-
 ramento River.
 Best twenty-five ears of corn...five dollars...G. C. Holman, San Joaquin.
 Best exhibit of tomatoes...five dollars...L. A. Gould, Santa Clara.
 Best exhibit of carrots...ten dollars...J. Lewelling.
 Best exhibit of peanuts...ten dollars...J. T. Carter.
 Best exhibit of beets...ten dollars...J. O'Donnell.
 Best exhibit of gourd squashes...diploma...Chinaman, John Dick.

FLOUR.

Best hundred pounds wheat flour...framed diploma and ten dollars...G.
 C. Yount, Napa.
 Best hundred pounds corn meal...framed diploma and ten dollars...Bates
 & Lane, Stockton.
 Superior flour...framed diploma...Heslep & Bell, Tuolumne County.

NATIVE WINES, ETC.

Best California wine, made in 1842...framed diploma...Sansevaine Bros.,
 San Francisco and Los Angeles.
 Second best do...framed diploma...Kohler & Frohling.
 Currant wine...ten dollars...S. Thompson.
 Superior native wine...diploma...S. W. Halsee, Los Angeles.
 Best sample California made cider...diploma...S. E. Oakley, of San
 Francisco.
 Best sample of pear brandy...Mons. Roze, San José.

CURED MEATS AND PRESERVED FRUIT.

Best exhibit of California cured ham...diploma...Wm. L. Overhiser, of
 San Joaquin.
 Best exhibit of preserved peaches...diploma...Miss C. M. Creed, Marys-
 ville.
 Best exhibit of fresh peaches, in tins...framed diploma...Geo. H. Beach,
 Marysville.

CHEMICALS, ESSENCES, ETC.

- Best exhibit of hops...framed diploma...J. A. Hobert.
 Best exhibit of pharmaceutical preparations, chemicals, etc...framed diploma...Little & Co., San Francisco.
 Second best do...framed diploma...Dr. Lanszweert, San Francisco.
 Best exhibit of wines, bitters, essences, and syrups...framed diploma...Turner Brothers, San Francisco.
 Second best do...framed diploma...Mr. Barbier.
 Best exhibit of alcohol, extracted from the pear...diploma...Mons. Roze, of San José.
 Best exhibit of sal soda...diploma...B. F. Knox & Co.
 Best exhibit of powdered sage...diploma...S. M. McLean, Stockton.
 Best sample of American saffron...diploma...S. H. Debnam, Stockton.
 Best exhibit of alcohol, ninety-five per cent. proof, made from beet root...framed diploma...Eugene Delessert, San Francisco.
 Best exhibit of brandy, manufactured from beets...framed diploma...E. Delessert, San Francisco.
 Best domestic refined sugar...framed diploma...San Francisco Refinery.
 Best California salt...diploma...De Boom & Greenwood.
 Best fifty pounds of California beet sugar...fifty dollars...Eugene Delessert, San Francisco.
 Best exhibit of soda and mineral water...framed diploma...Lippencott & Belding, Stockton.
 Best exhibit of natural mineral water...framed diploma...C. H. Allen, Napa Springs.
 Best exhibit of mustard...ten dollars...H. C. Hudson, San Francisco.
 Best exhibit of ground coffee and spices...premium...W. H. Bovee & Co., San Francisco.
 Best exhibit of ten pounds of honey...framed diploma...Wm. Buck.
 Best exhibit of soap...fifteen dollars...J. P. Dyer, San Francisco.
 Best exhibit of sperm, black-fish, seal, solar, coast and tanners' oil...framed diploma...R. F. Knox & Co., San Francisco.
 Best exhibit of maccaroni...premium...J. A. Meuli, San Francisco.
 Best exhibit of vermicelli...premium...J. A. Meuli, San Francisco.
 Best exhibit of California made cigars...diploma...Selig & Bro., Stockton.

BUTTER AND CHEESE.

- Best exhibit of butter...ten dollars...Mrs. J. F. Wood.
 Second best do...five dollars...Mrs. H. M. Fanning.
 Best exhibit of cheese...framed diploma...E. Bent, Contra Costa.

DOMESTIC BREAD.

Best sample of domestic bread, by a young, unmarried lady...silk dress or fifty dollars...Anna Van Valkenburg, eleven years, Stockton.

For exhibits of superior bread, framed diplomas were awarded to the following ladies: Misses Mary H. Buffington, A. L. Abbott, Lizzie Horr, Bridget Loney, Minnie Hatton, Miss Kierskie, Stockton; Ellen Kelly, San Francisco.

Largest collection of bees...twenty dollars...W. Buck, San José.

IRON AND BRASS WORK, ETC.

Best exhibit of picks...ten dollars...Wm. Peasely, Murphy's.

Second best do...framed diploma...Mr. Labush.

Best sample of breast chains...framed diploma...G. Dahl, Stockton.

Bank, jail, and pad lock...framed diploma...John Hyers, San Francisco.

Patent lock...diploma...J. C. Plotz, Stockton.

Case of brass work...framed diploma...W. F. Moore, San Francisco.

Fire engine pipes...framed diploma...John Wetzell, San Francisco.

Best fire and powder proof wrought iron safes...framed diploma...T. A. Auberlin and Herman Eggert, San Francisco.

Best exhibit of California made confectionery...framed diploma...A. Gall, Stockton.

Fine exhibit of do...diploma...Mereau & Benhan.

Best exhibit of seamless gold-pans...premium...O. J. Backus, San Francisco.

Best exhibit of leveling instruments...premium...Thos. Tennent, San Francisco.

Best exhibit of California leather...fifteen dollars...Joseph Baston, San Francisco.

Best exhibit of black bridle leather...framed diploma...Samuel Stinner.

Best exhibit of penmanship...framed diploma...G. W. Wooley, Sacramento.

Best exhibit of card writing...framed diploma...Mr. Mitchell.

Fine exhibit of do...framed diploma...J. D. Burdick.

Best revolving wind pump...twenty dollars...Hart & Derrick, Stockton.

Superior do...diploma...Mr. ———, Marysville.

Best artesian well...framed diploma...L. A. Gould, Santa Clara.

Second best do...framed diploma...Mr. Austin, Stockton.

[This well was bored thirty-five feet deep with a two-inch auger, a lead pipe twenty-five feet long inserted, and pump attached, and pure, soft water running in one hour and forty-five minutes.]

Best ale...framed diploma...Lion Company Brewery, San Francisco.

Best sample of lager beer...premium...Wm. Busch.
 Best exhibit of boots and shoes...diploma and five dollars...F. Mabus,
 Stockton.

HATS, CAPS AND FURS.

First premium for dress silk hats...framed diploma and five dollars...
 Collins & Tiffany, San Francisco.
 First premium for caps...framed diploma and five dollars...Mr. Harris,
 San Francisco.
 Fine dress hats...framed diploma...A. Lamot, Sacramento.
 Best specimen of furs...framed diploma...T. Young, San Francisco.
 Best California manufactured brushes...framed diploma...Newman Bros.

PAINTING, ETC.

Best ornamental sign painting...diploma...Hopps & Lougee, San Francisco.
 Imitation of wood and marble work...diploma...F. Robinson.
 Best exhibit of water color painting...ten dollars...Eugene Cameron.
 Painting of Yo-Semite...diploma and twenty-five dollars...Mons. Cleaveau.
 Best model of weather strip for doors and windows...premium...E. D. Rice, San Francisco.
 Best California marble mantle-piece...twenty-five dollars and framed diploma...P. S. Devine, Sacramento.
 Soda fountain, of Columbia marble...silver cup...Mr. Vinson.
 Specimen of marble work...framed diploma...D. H. Benedict & Co.
 Best exhibit of granite...framed diploma...California Granite Company, Sacramento County.
 Best exhibit of dentistry...ten dollars...Dr. D. Burbank, San Francisco.
 Best sample of rope...diploma...Tubbs & Co.
 Best exhibit of California made clothing...ten dollars...Swartz, Stockton.
 Best sample of fire brick...diploma...M. Williams.
 Best sample of face brick...diploma...Eben Morrell, San Francisco.
 Best California made piano...framed diploma and twenty-five dollars...M. Zeck, San Francisco.
 Best specimen of job printing...medal and framed diploma...Whitton, Towne & Co., San Francisco.
 Best sample of newspaper printing, on satin...diploma...Alta California.
 Best specimen of book binding...framed diploma...J. A. McGlashan, San Francisco.

Best California made billiard table, made of wood grown on the Pacific
...framed diploma and fifteen dollars...Mr. Bach, San Francisco.

Best exhibit of pottery...diploma and five dollars...Marcus Williams.
"May Queen" washing machine...framed diploma.

Best exhibit of stencil plates...framed diploma...J. F. Hall, San Francisco.

Best horse power...framed diploma...C. R. Conant, Stockton.

Best spoke-boring machine...framed diploma...J. Menges.

BROOMS.

Best exhibit of brooms...diploma and five dollars...H. Lusk & Co.

Superior brooms...diploma...E. D. Bronson & Co., Sacramento.

Best broom-making machine...diploma...J. A. Wolf, San Francisco.

NEEDLE WORK, EMBROIDERY AND WORKS OF ART.

One child's dress...napkin ring or five dollars...Miss C. Hutchinson.

Gentleman's shirt...gold thimble...Miss Frances J. Harris, (eleven years old.)

Crochet collars...napkin ring or five dollars...Miss Cecilia Henderson, Stockton.

Best machine sewing...silver goblet or twenty-five dollars...Mrs. P. E. Rogers, San Francisco.

Best silk bed-quilt...framed diploma and ten dollars...Mrs. Fairbanks.

Second do., in flags of all nations...silver cup of ten dollars...Miss E. F. Baldwin.

Superior spangled bed-quilt...silver cup or ten dollars...Mrs. L. Dahl.

Best cotton quilt...diploma and ten dollars...Mrs. A. White.

Fine cotton do...napkin ring or three dollars...Mrs. D. C. Rood.

Fine do. do...napkin ring or three dollars...Miss M. Kroh, Stockton.

Mrs. Mattison, Hannah M. Clark, Mrs. W. Walls and Miss Lizzie Melvey, each received a napkin ring or three dollars for fine bed-quilts.

Bonnet made from the leaves of South Carolina pine...napkin ring or four dollars...Mrs. T. F. Nevins, Alameda.

Fine display of needle-work...napkin ring or four dollars...Mrs. D. C. Rood.

Superior embroidery on satin...four dollars or napkin ring...Mrs. Medina.

Superior piece of embroidery...five dollars or napkin ring...Mrs. H. S. Sargent.

Superior worked skirt...five dollars or napkin ring...Miss Ellen G. Estabrook.

One China dress...framed diploma or fifteen dollars...Luck Chung.

Best embroidered opera cape...diploma or ten dollars...Miss D. Kennedy.

- Embroidered scarf...five dollars or napkin ring...Mrs. J. L. Sanford.
 Best embroidered skirt...ten dollars...Mrs. J. L. Sanford.
 Superior embroidered skirt...five dollars or napkin ring...Mrs. Ruggles.
 Best exhibit of regalia...framed diploma and ten dollars...Mr. and Mrs. Norcross, San Francisco.
 Second do...framed diploma...T. R. Johnson, San Francisco.
 Fine worsted embroidery...napkin ring or five dollars...Mrs. Medina.
 Silk embroidery on paper...framed diploma...Mrs. Borato.
 Fine embroidery, representing the "Happy Family"...five dollars...Misses Dennis.
 Best worked lamp mat...diploma...Mattie C. Peters.
 Best exhibit of artificial flowers...five dollars...Mrs. C. A. Mead, Stockton.
 Best exhibit of shell work...five dollars...Mrs. Medina.
 Best ornamental leather work, book shelf...five dollars...Miss Smith, Sacramento.
 Superior leather work...five dollars or napkin ring...Mrs. E. R. Stockwell, Stockton.
 Frame and flowers, made of collection from Yo-Semite Valley...silver cup...Mrs. Laura, of La Grange.
 Two vases wax flowers...five dollars or napkin ring...Mrs. H. M. Fanning, San Joaquin.
 Case of jet ornaments, made from rose leaves...silver goblet or ten dollars...J. M. Birdsell.
 Oriental pearl work...napkin ring or four dollars...Mrs. E. W. Witherington.
 Picture frames, made from pine burrs...napkin ring or five dollars...Mrs. J. M. Taylor.

FURNITURE AND UPHOLSTERY.

- Best set of parlor furniture...framed diploma and fifteen dollars...J. G. Clark & Co...San Francisco.
 Best set of chamber furniture...framed diploma and ten dollars...J. G. Clark & Co.
 Best mattress, made from curled hair...diploma...Jacob Schreiber.
 Best exhibit of quartz rock...five dollars...Goodman, Diltz & Co., Whitlock's Creek, Mariposa County.
 Second best collection of quartz specimens...Eureka vein, Amador County.
 Third best collection of quartz specimens...framed diploma...from Mount Gaines claim.
 For collection of quartz specimens from Kern River, very good...framed diploma.

- For collection from "Mary Rose" claim, Kern River...framed diploma.
- For collection of carbonate of copper; fine specimens, taken seventy-five miles from La Paz...diploma...J. A. Collins, San Francisco.
- For exhibit of cinnabar, very fine, from the New Almaden mines...diploma.
- For exhibit of lignite coal, Alameda...diploma...to Alameda Coal Mines Company.
- For specimens of native silver ore, taken fifteen miles from La Paz...framed diploma...J. A. Collins.

MACHINERY, ETC.

- Model of a furnace for expelling sulphur from auriferous pyrites...framed diploma...Mr. Diltz, Mariposa.
- Mold of Howland rotary quartz crusher...framed diploma.
- Morris' gold amalgamator...framed diploma.
- Model of riffle box...framed diploma...R. Gilchrist.
- Best exhibit of hydraulic pipes...framed diploma...Bryant & Co., San Francisco.
- Model of quartz amalgamator...diploma...R. Gilchrist.
- Model of Weaver's drop riffle box...framed diploma...E. A. Taylor.
- Best collection of California birds, stuffed and mounted...twenty-five dollars...E. S. Holden.
- Second do., California birds, stuffed and mounted...diploma...Dr. R. K. Reid.
- Best collection California Natural History...twenty-five dollars...California Society of Natural History, of Stockton.
- Best ambrotypes...framed diploma...R. H. Vance, San Francisco.
- Best photographs...framed diploma...Vance.
- Best daguerreotypes...framed diploma...Vance.
- Best drawing; "Sketch of Stockton"...framed diploma and ten dollars...E. Cammeron.

SADDLES, BRIDLES AND HARNESS.

- Single buggy harness...ten dollars...Main & Winchester, San Francisco.
- Best set of team harness...twenty dollars...M. L. Bird & Co., Stockton.
- Riding bridle...five dollars...Main & Winchester.
- Best gentleman's saddle...fifteen dollars...Main & Winchester.
- Second do...five dollars...M. L. Bird & Co., Stockton.
- Best side saddle...fifteen dollars...Main & Winchester.
- Second do...five dollars...M. L. Bird & Co.
- Best exhibit of saddle trees...diploma...Horn & Cunningham, Stockton.

WAGONS AND CARRIAGES.

- Best one horse carriage, a road sulky...framed diploma...H. M. Bernard, Sacramento.
- Best one horse wagon...framed diploma...J. L. Ottignon.
- Best two horse spring wagon...framed diploma...Hafner & Co., Stockton.
- Best farm and family wagon...framed diploma...A. Rankin.
- Best four horse wagon...framed diploma...D. C. Mattison, Stockton.
- Best freight wagon...framed diploma and fifty dollars...W. P. Miller, Stockton.
- A superior sulky...framed diploma...E. L. Howe, Stockton.

AGRICULTURAL IMPLEMENTS.

- Threshing machine; model exhibited by Messrs. J. N. & B. H. Hoag... special premium.
- Harvester and thresher; model exhibited by Mr. Verrell, of San Joaquin...diploma.
- Reaping machine; exhibited by S. Williams, of Stockton...award of first premium, thirty dollars.
- Mowers—S. Williams' reaper, which is a combination of the mower, received the first premium in that class...twenty-five dollars.
- Plows—To Thos. Ogg Shaw was awarded the first premium for best steel plow, of California manufacture...diploma and ten dollars.
- Mr. McDow, of San Francisco, was awarded the second premium for second best steel plow.
- Mr. Marshall, of Sacramento, was awarded a diploma for the same article.
- Mr. Mattison, of Stockton, received diploma and special premium for a steel plow, adapted to two or four horses.
- Mr. Marshall, of Sacramento, was awarded the first premium of ten dollars and diploma, for the best cast plow.
- Gang plows—Mr. Marshall, of Sacramento, first premium...twenty dollars and diploma.
- Mr. Mattison, of Stockton, second do...ten dollars.
- Thos. Ogg Shaw, of San Francisco...diploma.
- Best sub-soil plow, Thos. Ogg Shaw, of San Francisco, first premium... twenty dollars and diploma.
- Best fanning mill, Thos. Ogg Shaw, of San Francisco, first premium... fifteen dollars.
- Best harrow, Thos. Ogg Shaw, of San Francisco, first premium...ten dollars.
- Second do., D. C. Mattison, of Stockton...diploma.
- Best churn, Thos. Ogg Shaw, of San Francisco...ten dollars.

Best butter-worker and churn, J. L. Atkins, of Sacramento, first premium...five dollars.

Best cheese press, H. McNally, of San Francisco...ten dollars.

Best garden wheelbarrow, first premium...D. C. Mattison, of Stockton.

Volunteer cultivator, D. C. Mattison, of Stockton...first premium.

Best cultivator...framed diploma...D. C. Mattison, of Stockton.

A special premium and diploma awarded to E. H. Comstock, of San Joaquin, for improved volunteer cultivator.

Model of a water elevator and self-acting farm gate...diploma...J. Perkins, San Francisco.

Exhibit of imported agricultural implements and cider press...diploma...Thos. Ogg Shaw, San Francisco.

Best six grain forks...five dollars...D. C. Mattison, Stockton.

[Among imported agricultural tools, the committee particularly notice the Boston steel clipper plows, X4½ and X8, from Treadwell & Co., San Francisco, for which a diploma was awarded. Portable cider and grape mill from Thos. Ogg Shaw, diploma. Mr. Shaw also received a diploma for hoes, barley forks, scythes and snaths, corn sheller, self-acting cheese press, circular straw table, improved farm gate, and potato forks.]

[Hewlett & Collins, of Stockton, received a diploma on importations manufactured to their order, as follows: Boston steel clipper plows, with wheel and coulter, for two or three horses; mowing machines, fanning mill, Scotch harrow, cast and steel plows, straw cutters, ox bows, corn shellers, and show of imported tools.]

Birkford & Huffman's drill, shown by Messrs. J. N. Hoag & Co., of Yolo County...diploma.

EQUESTRIANISM.

Most accomplished equestrian lady...a seventy-five dollar saddle...Miss Annie Stephens, of Sacramento.

Second do...silver plate, worth thirty dollars...Mrs. Dr. Grattan, of Stockton.

Third do...a ten dollar riding whip...Miss Lucy Phelps, (eight years old,) of San Joaquin.

SOCIETY'S PURSE.

Best trotting stallion, "Rattler"...first premium, one hundred dollars...Fred. Werner.

Second best do., "Comet"...framed diploma...B. Fish.

Best trotting roadster...first premium of one hundred dollars..."Fred. Warner," owned by Dr. White.

Second best do., "Morgan"...framed diploma.

Best trotting colt, bay stallion "Dominic Burnett"...framed diploma...Mr. Bowman, of San Francisco.

Best pacing roadster, brown horse "Sam. Berry"...one hundred dollars...Dr. Crandall.

Second best do., "Little Pet"...framed diploma, Wm. Brown, of Sacramento.

Best pacing stallion, "Bill Blanton"...diploma and fifty dollars...H. McNally, of San Francisco.

Society's purse of two hundred and fifty dollars, for three year old colts; to stud colt "Shanghae," three years old; Geo. Vanbauer.

For the best rider of a wild horse...purse of fifty dollars...J. C. Glen.

FIRE ENGINES.

Best performance of fire engine of the first class...silver trumpet awarded to "Monumental" Co., No. Six, of San Francisco.

Best performance of fire engine of the second class...silver trumpet, to "Eureka" Co., of Stockton.

Best performance of fire engine of the third class...silver trumpet, to "Young America" Co., of Sacramento.

OPENING ADDRESS

TO THE CALIFORNIA STATE AGRICULTURAL SOCIETY,
SEPTEMBER, 1857.

BY THE PRESIDENT, WILLIAM GARRARD.

LADIES AND GENTLEMEN:—Among the many causes that bring our people together, there is none more likely to prove interesting and instructive than the Annual Fair of the State Agricultural Society. Here we assemble from all parts of the state, each bringing with him that article in the production of which his neighborhood excels. Here we have a bird's-eye view of the partially developed resources of our young but rich state; and if we come together with doubts in our minds as to making California our permanent home, we leave with those doubts removed, and a determination to live and die among her golden hills, or in her broad and beautiful valleys. Here we witness, annually, the certain, and in many instances wonderful, progress made by us in the production of those articles that make our homes dearer and render our state less dependent upon other countries for the necessities, comforts and luxuries of life. With our great variety of climate and soil, with our great natural advantages for manufacturing, equal to any country in the world, those who visit these exhibitions and see how much has been done in a few years, must be convinced that California needs nothing but population to place her among the first, if not the very first state of this Union.

There is no other country that offers to her citizens the same inducements for permanent location as California. Think of what we were seven years ago, of what we are now, and who will venture to prophesy our condition half a century hence? *Then* we were dependent upon foreign countries for nearly everything we consumed; *now*, in the short space of seven years, we are prepared to meet the entire demands of our people for many articles, and what is yet better, we can spare a great deal of our own productions to exchange for those we are not yet able to produce, and thus retain among us our gold to improve and beautify our houses. We have not only ceased to import grain and breadstuffs, but are returning thousands of dollars worth annually, to the very ports from which we, five years ago, imported millions. Many other articles we have ceased partly or entirely to import. To enumerate them would be to mention nearly half the things of daily use and consumption.

The experience of the last two years has demonstrated another important fact, namely: that this climate is as well adapted to curing meats,

both by salt pickle and smoking, as Ohio or Kentucky. But the great difficulty has been to raise hogs at a price to compete with the imported article. The trouble has not been in the fattening, for here we can raise grain as cheaply as most countries; but it has been found in the absence of proper grasses on which to raise and grow the hogs. The rich clover pastures that are found so essential to the hog crops in the western states, have heretofore been wanting among us after the month of May, owing to our long dry season. But the successful cultivation of two new crops, just introduced among us, will remove entirely this deficiency, and if I am not mistaken, it will be but a few years when the importation of pork, bacon and lard, will have ceased. The value of these crops must be estimated in millions. I refer, of course, to the introduction of Chinese sugar cane and Chile clover; especially the latter. It is certain, that on large districts of our country, when other grass crops dry entirely up before the month of June, alfalfa will, when once well rooted, continue green the year round, yielding three hay crops annually, and affording a full pasture, equal in richness to a grain field. This crop seems designed by Providence for our peculiar climate. Whilst it makes good hay, good pasture—spring, summer, fall and winter—it, unlike the native club or eastern red clover, has its seeds securely incased; as the rich burr clover of our southern counties, but is superior to that in the absence of its prickly burrs. The principal advantage of this clover consists in its capacity to send its roots to water, however deep, and thus draw sufficient moisture to keep green throughout the dry season. Our visiting committee found, at Mr. Cameron's farm, on Feather River, that the roots of this clover had penetrated to low water mark, a depth of over seventeen feet. This crop, however, is said to have this peculiarity, which should be well understood, that when once well rooted it cannot be exterminated, and of course no other crop can be cultivated on the same land. Of the Chinese sugar cane, less is known from experiments in this state, but out of many packages of seed distributed by our Society, not a single instance is known when the crop failed to mature, whether irrigated or not; and in some localities—at Mr. Campbell's, on King's River, for instance—it has reached a perfection unknown in other states.

Our display of fruits and flowers is well worthy of your highest admiration. Here the citizens of every country and climate may see the fruits that were most familiar to their childhood, and many others they knew nothing of. We not only excel in variety, but also in quality. Where else will you find such apples, peaches, pears and grapes, growing alongside of the orange, the fig, the pomegranate, the almond, and most other tropical fruits? How many of you are aware that there are single farms in this state containing, each, over half a million of fruit trees, in orchard and nursery? One person owning enough trees, when fully matured, to produce as much fruit, other than grapes, as will be sold this year throughout our state. The day is not far distant when fruit will be an important crop for raising and fattening swine. But one of the most interesting facts developed by this and similar exhibitions held in different parts of the state this year is, that there is a belt

of country running clear through our mountains, and near the gold region, that is equal to any portion of our valleys in the production of several of the principal kinds of fruit.

The exhibition of live stock, you will find, is by far the largest, and greatly superior in quality, to any heretofore presented by our Society. This was to be expected, and we may hope for many years to come, the improvement in quality, at least, will be observable each year. There is no business to which our state is more admirably adapted than the raising of stock. We have fewer diseases, and a greater variety of grasses, than any other country in the world. The importance, however, of improving our breeds, especially of our cattle, is not, I fear, properly appreciated. In a short time, the wide, and as many thought, exhaustless range, will be gone for at least six months in the year, and we will have to look to cultivated grasses on which to fatten our beef and mutton. Indeed, already we find it difficult to supply the market with good beef during the months of January, February and March. Last winter, and we may expect the like next, the same quality of beef brought double the price in March that it would have sold for in the June preceding, or following that month. If, then, we are to cultivate grass which is to supply our markets with good winter beef, it becomes a matter of the highest importance that we should improve our breeds, and hence the necessity for the importation of fine blooded cattle. This, I am happy to say, has already commenced, and you will find in our stables, cattle that you might feel proud to exhibit in any state in the Union. It is believed, by persons experienced in stock raising, that a half blood, short horn Durham, for beef purposes, when grass is valuable, is worth fifty per cent. more than the common stock, and that the same amount of grass fed to thorough-breds will double the quantity of beef, if fed to our native herds. The reason of this is, that the short horns feed kinder, mature a year or two earlier, and are capable of carrying much more flesh than the common stock. Our Society, then, could not be more advantageously engaged, than by offering every inducement in their power to the importation of fine blooded cattle into our young state. You will find the exhibition of horses, jacks, mules, sheep and swine, highly worthy of your attention.

Notwithstanding that last season was an unfavorable one for the grain crop, you will find it equal to all our wants, and offering a handsome surplus for exportation. Another good rain during the latter part of April, and we would have produced near or quite double the amount of grain ever before grown in any one year of our state's existence.

And this, too, is a country where we have four months in which to sow, the same in which to harvest, and where one man with a good team, by volunteering one half annually, can cultivate one hundred acres.

Who can doubt that if this exhibition (gotten up, as it is, by the limited means of our young Society,) could be transferred to each county in the United States, an immigration would pour in upon us that would place California, in a few years, where she is destined some day to stand, among the first and wealthiest states of our Union?

But in casting our eye over our state as it is, and sending our mind

back to the old homes, for another sight of which our hearts yet long, what is it that they and we at once agree is most needed to link us closer together and unite our destinies forever as one people?

All must admit that the great desideratum of the age is a connection, by railroad, of the Father of Waters with the bay of San Francisco. To us it is a matter all important, to them it is a little less so.

But if our eastern friends are still disposed to postpone this great work; if the success of mere political parties is of more importance to them than our union by railroad; if its accomplishment is still to be postponed to the discussion of fruitless, and more than fruitless, questions, then at least those annual exhibitions will have the advantage of convincing our people of our capacity to supply and protect ourselves, independent of all federal aid or protection whatever.

Whilst I would not instill into the bosom of any one even a lukewarmness toward our federal government, it cannot be denied that if the talent of our state had more state pride about it, more anxiety to develop our hidden resources, more pride in state honors, and a less hankering after federal appointments and federal positions, we would be a happier, a prouder, a richer, and a more contented people.

But it is to you, ladies, especially, that we are to look for the successful cultivation of a home sentiment—a California sentiment. It is you, more than any other portion of society, that have the power, by corresponding with your friends in the east, to bring to the Pacific that class of population that ties us to the soil and renders home endearing. It is you who have in charge the character of California's future society. Cultivate in the rising generation a regard for the old-fashioned homespun virtues—virtues that have become characteristic of the American people, not only in their social intercourse, but also in their form of government. I heard it remarked the other day, by a gentleman of distinguished talents, that our system of government was the perfection of human wisdom; that the glaring faults detected by all, in its administration, were not owing to a want of intelligence in the people, because ours were the most enlightened and intelligent people in the world; but, said he, it is the heart, and not the head, that needs training and education. This branch of education is almost exclusively in your hands, ladies, and to you is intrusted the future destiny of this golden state. Emulate the example of the mothers of the olden time, in cultivating a love of the soil, a love of home, an individuality of character, a state pride, and California will yet fulfill the fondest anticipations of her most sanguine admirers.

ANNUAL ADDRESS,
DELIVERED BEFORE THE FOURTH ANNUAL MEETING OF
THE STATE AGRICULTURAL SOCIETY.

BY HENRY ENO.

The occasion which has called together this great assembly from every part of California, is a joyous one ; and no more fitting time could be selected than this, when the harvest is gathered, and the fruits of the teeming earth are ripened. Independent of the gratification which all must naturally feel in viewing the rich productions of the fertile soil of California, so lavishly scattered around us, there is a practical utility in meeting together, in comparing observations, and interchanging opinions, one with another. The intellect of that man must be obtuse indeed, and his mind most sadly warped, who can spend a few days here in communion with his fellow-man, and with these evidences before him of what can be accomplished by well directed industry, who can leave, and not be a wiser and a better man.

It is the peculiar province of agriculture to minister to the immediate wants of man, and it is a subject which has been dwelt upon by the poet and the philosopher, in all ages. The one has thrown around it all the gorgeous colors of a glowing and excited imagination, the other has shown how necessary and all-important it is that to the labor of the husbandman should be added the rich treasures of science and art. No country has ever risen to any great and commanding eminence and for any length of time sustained itself without the solid basis of an agricultural population. But it is unnecessary for me at this time to dilate upon this subject, or attempt to show the intimate connection which exists between the great interests of agriculture and the highest degree of civilization and refinement, and also the perpetuity of our free institutions, for it must be apparent to all who cast a thought upon the subject. Although agriculture occupies a prominent position among the industrial pursuits of man, still it is intimately connected with the mechanic arts, commerce, and manufactures ; they are all like the timbers of a well constructed arch, mutually dependent upon each other ; whatever benefits and supports the one, assists the other.

The late industrial exhibition at San Francisco has shown to the most skeptical that the mechanic arts are already in a high state of advancement ; it has conferred the highest degree of credit upon its projectors, and reflected honor on the state. Each successive year will add new interest to the exhibition, and by exciting a noble emulation to excel,

the utmost perfection will be attained. We, too, have met together, in a spirit of generous rivalry, to contend for the prizes offered for the productions of the soil, and of art, and our bosoms beat with an honest pride when we point to these triumphs of peaceful industry, and show to the world how much more they are to be valued than the triumphs of war. At this time, too, we have every occasion to be thankful to the Giver of all Good, that although He has decreed that man should "earn his bread by the sweat of his brow," He has also given the promise that "seed time and harvest should never fail."

It is not uninteresting or unimportant, on this day, to look back on the past. In 1769 and '70, the first settlements were made in Upper California, (at San Diego and Monterey,) by the Mexicans. They held possession of the country for nearly eighty years, until, by the treaty of Guadalupe Hidalgo, it was annexed to the United States. The progress of the Mexicans in the arts of life was slow, and the increase of population was but trifling. The agriculture of the country was in the lowest state possible; there was no commerce of any amount, and no manufactures; the cattle, it is true, roamed over a thousand hills, but were valued only for their hides and tallow. This state of things continued until the whole Pacific coast woke up to new life, by the advent of the Americans, in the memorable year of 1849. Not ten years has passed away, scarcely a day in the history of nations, and there has been added to the population of the country more than four hundred thousand inhabitants, who have added to the wealth of the world more than five hundred millions of gold, taken from her rivers and dug from her hills and mountains.

This is something to be accomplished in less than ten years; but we have accomplished more than that, for we have, in the meantime, been engaged in building up cities, improving farms, making roads and bridges, and have constructed canals for the purpose of bringing water to mineral ground for mining purposes, the aggregate length of which is greater than the distance from San Francisco to Boston, measured by the way of the Eden of the Mormons—Salt Lake. For the first three or four years, but little attention was paid to agriculture. The whole country ran riot in its thirst for gold. No one came here for any other purpose than to make "his pile" and return. We were dependent upon other countries for all the necessities and luxuries of life; and with a reckless prodigality, which was never equaled, millions upon millions of dollars were squandered in worse than folly. It was, however, soon discovered that we had other mines of wealth than those of gold—that the soil was of wondrous richness and fertility, and the attention of thousands was directed to it. And what has been the result? The answer to that question is, that California now does, what is not done in the old settled states of Maine, Vermont, New Hampshire, Rhode Island, Connecticut, Massachusetts, New Jersey, North Carolina, South Carolina, Georgia, Alabama, Louisiana, Arkansas, Tennessee, Florida, and even the empire state, New York. We raise wheat enough for our own consumption, and some to spare. In 1856 there was raised two million nine hundred and thirty-seven thousand two hundred and thirty-

six bushels of wheat; three million two hundred and twenty-nine thousand two hundred and thirty bushels of barley; three hundred and sixty-four thousand four hundred and twenty bushels of oats; one hundred and sixty-five thousand four hundred and sixty-four bushels of corn; seven hundred and twenty-one thousand eighteen bushels of potatoes; two hundred and forty-eight thousand nine hundred and eighty-two pounds of wool; four hundred and fifty-two thousand one hundred and seventy-three pounds of butter; two hundred and forty-six thousand one hundred and thirteen pounds of cheese. We had eighty-one thousand seven hundred and three horses; seventeen thousand seven hundred and thirteen mules; five hundred and twenty thousand two hundred and seventy-six head of cattle; one hundred and ninety-two thousand two hundred and seventy-one sheep; one hundred and thirty-eight thousand nine hundred and ten swine. Of fruit trees we had one million seventy-one thousand seven hundred and thirteen; of grape vines, one million three hundred and seventeen thousand nine hundred and fifty-seven. Previous to 1849 there was scarcely a grist or saw mill in the land—now we have one hundred and thirty-one grist mills and three hundred and seventy-three saw mills; seventeen tanneries; fifteen iron foundries; one paper mill, with the capacity of turning out six tons of paper per week; a sugar refinery, that can manufacture four hundred tons of sugar and twenty thousand gallons of syrup per month; and a cordage and oakum manufactory in successful operation; and one hundred and thirty-three quartz mills, propelled either by water or steam power. May we not *modestly* ask, what state, of not more than ten years existence, can show a parallel to it?

Although our rich gold fields are not yet exhausted, but still yield their rich treasures to the hardy and industrious miner, and will probably do so for long years to come, yet it must be evident to the political economist, and even to the most careless observer, that the future hope of our state depends almost entirely upon the progress and advancement of the great interests of agriculture, mechanic arts and manufactures. The prosperity and happiness of a nation is measured by the due proportion which all the various branches of productive industry bear to each other. Every department should be fostered, encouraged and protected; by means of which labor is assured of constant employment, and in a liberal reward for labor is it only rendered in the highest degree efficient. Inventive genius is thereby stimulated and rewarded, and every product of the elements, or of human effort, adapted to a beneficent use.

In all the various departments of human industry, agriculture is the noblest, and takes the highest rank. It is a science, and the knowledge of it as a science should be a part of the education of the people; the mind of the farmer should be as well cultivated as his field. He should not only be a worker, but a reading, thinking, self-reliant man. I hope, therefore, not to be considered as presuming too much, in commending to you at this time the establishment of a People's Agricultural College. In many of the old countries of Europe they have agricultural schools, which have been attended with the happiest results. The state of

Michigan has the high honor of first opening a college for the instruction of her youth in the science and practice of agriculture. It has a domain of seven hundred acres, with an endowment of twenty thousand dollars per annum, for two years, granted by the state. Wisconsin has followed her example, and has also established an agricultural college, which I believe is liberally endowed. California should follow in her wake. There is a tenfold greater necessity for an agricultural school here than in the States, although agriculture has been successfully pursued here for the last four or five years; yet farming has hitherto been a matter of experiment, and must continue so for many years to come. We have a different climate, a different soil; and different modes of culture must be adopted from what we have hitherto been accustomed to. The farmer has everything to learn. The books treating of agriculture, written in the older states or England, are to him of but little account; and notwithstanding all the knowledge and experience acquired by him elsewhere, he finds himself but a novice here. It is true, the great principles which overlie this science are the same everywhere, yet in California the details are essentially different. In this mild climate there is a sort of blending of the temperate and tropical regions, and we can cultivate many trees, plants and vegetables, which cannot be raised in the other states. We want, then, an agricultural college; and can have it, if the people set about it in downright earnest. The United States government should make us a donation of land for that purpose; our great landholders in every part of California could well afford to part with some of their broad acres, and patronize, in a liberal manner, such an institution, from which in the course of a few years they would reap incalculable benefits. The state of California has her swamp lands, a part of which, if donated to this object, would assist in placing it on a secure and firm basis. No constitutional objections, it appears to me, could be raised, either by the state or federal government, to the making donations for the establishment of an agricultural college, (although in these days it is much the fashion to raise constitutional objections to acts of congress and the state legislature,) for if it is constitutional for the United States government to found a school for the instruction of our youth in the art of war, it certainly would be constitutional to donate land or money to establish a school to instruct them in the arts of peace; and in the opinion of many, the one is of as great national importance as the other. Although obtaining aid from the federal and state governments, it should be a people's college, and managed by the people, for if it is a state institution, there is too much danger that it would be a sort of hospital, or house of refuge, for dilapidated and decayed politicians; neither should it be located within a hundred miles of the seat of government, so that students attending it would be out of the reach of any corrupting influences.

It must be evident to the most superficial observer, that to secure the utmost success in agriculture, a knowledge of it as a science is essentially necessary. It is important that the farmer should understand geology—that science which treats of the compound minerals and aggregate substances which compose the earth, and the relations which they bear to

each other. He should be acquainted with botany, or the nature and uses of the various trees, plants and shrubs, which are found in the country. It is all-important that he should understand chemistry, by a knowledge of which the farmer can analyze his soil, and supply what is necessary to induce the greatest fertility. Many other sciences, such as zoology, meteorology, and physiology, and in fact almost all the sciences which have *ology* for their termination, minister either directly or indirectly to agriculture. In an agricultural college, all information in relation to everything bearing upon the subject of agriculture would be collected, and, through the students attending it, disseminated to every part of the state. A college in which manual labor and intellectual culture were combined, would make not merely theoretical but practical farmers—the race of men we want in California, where the field of labor is almost a boundless one. A botanical garden connected with the college, where every tree and plant, either useful or ornamental, was cultivated, would serve a twofold purpose—it would give practical illustrations in the science of botany, (a pleasing as well as useful study,) and might be the means of introducing some new plant, some new tree or vegetable, of infinite value to the people of California. The Botanical Society of Paris, in France, about fifteen years ago sent an agent to the northern part of Iowa, for the sole purpose of procuring an esculent used by the Indians of that country, and which it was supposed could be successfully cultivated in France; and within a few years it is said that a new species of wheat, the product of a few grains found in an Egyptian mummy, has been grown, and which it is supposed will add one-eighth to the annual product of wheat raised in France. And were a professorship of mineralogy added, our great mining interest (in which so large a proportion of the productive industry of the state is employed,) would be advanced. There are hundreds of young men now toiling in our mountains, who feel the want of scientific knowledge of the business in which they are engaged, and who would gladly rest from their labors a short time and spend it in acquiring information in mineralogy. How to analyze mineral ores and separate the precious metals from them should not be confined to the few, but should be known to every one who intends to follow mining for a living.

I have spoken of farming—that, as hitherto conducted in this state, it has been a matter of experiment, and must continue so for many years to come. It is, however, no longer a matter of doubt, that we can grow all the cereals and all the vegetables and fruits that are raised in the Atlantic states. Our crops of wheat average more to the acre than in the best wheat growing districts of the older states. In barley we are already ahead of every state in the Union, excepting New York. The average yield of the oat crop per acre is believed to be superior to any other country. So with potatoes and other vegetables; but as we have a climate so materially different from the older states, we should not content ourselves with merely cultivating the same trees, plants and vegetables, and raising the same grains which are cultivated there. This is the age of progress. Improvements in every art and science are being constantly made, and the California farmer should not be con-

tented to stand still, but should look to other lands and other countries, where the climate is similar to his own, and import such grains, trees, fruits and vegetables, as are profitably raised there, and make himself acquainted with their peculiar modes of culture.

In Italy, and in countries bordering on the Mediterranean, where the climate is almost identical with our own, there are millions and millions of inhabitants who depend almost solely on the products of the vine, olive, fig tree, almond and other fruits. They are grown in such immense quantities that hundreds of vessels find employment in transporting them to all parts of the world; and here, in California, where all these fruits of the Levant can be grown in the utmost perfection, the foreign product is found in every fruit shop in the state.

At several of the old missions are to be found fig and olive trees, planted by the old padres; and there are also beautiful groves of orange, lemon and pomegranate, at Santa Barbara, Los Angeles, and San Diego, where the fruit is raised in high perfection; the fig, the olive, and the almond, can be raised in California, not only in sufficient quantities to supply our own wants, but the wants of the United States. This is a matter well worthy the attention, not only of the horticulturist, but the farmer. The increased value of a farm, which, in addition to the fruit trees commonly grown, had a few hundred fig, olive and almond trees, would be very great. There is much good sense in the advice given by the old Scotch miser to his son, (in one of Walter Scott's novels;) "When ye are doing naething else, be a-setting out a tree; it will grow when ye are sleeping."

In the cultivation of trees, the farmer and horticulturist not only consult their pecuniary interests, and provide a grateful shade from the summer sun, besides gratifying the love for the ornamental and beautiful in nature, but also obey the laws of hygiene, for it is now an established truth, that certain locations are secured from miasmatic influence by the intervention of trees and plants. The observations and experiments made by Lieutenant Maury (who has perhaps rendered more aid to the cause of science than any man living,) are well worthy of consideration and attention by those living where ague and fever is prevalent.

Intelligent, well informed Frenchmen, Germans, Italians and Spaniards, all unite in saying that there is no country of the Mediterranean, or of the interior of Europe, better adapted to the cultivation of the vine and the manufacture of wine and brandy, than California; that it has equally as good a climate and naturally a better soil; we can make in California equally as good wine as in sunny France, the Island of Madeira, or on the Rhine. The wines and brandies and adulterated compounds that come to us in the shape of rum, gin, and other *ardent* names, cost us more gold than all the quartz mills in the state yield. Already attention is being paid to the manufacturing of wine, and enterprising men are embarking in the business with all the knowledge, information and energy, necessary to insure success. By many it is believed that if wine was a common drink, there would be less intemperance. They have a saying in France, "More wine more work, more wine more sobriety." Whether truthful or not, men will drink wine, and

have drank it in all ages; the descendants of Noah have followed his example, and planted vineyards in all countries, where the soil and climate were favorable. If we must have wine, let us have the pure juice of the grape. It would be even some consolation to a man, when dying from the effects of drinking too much pure wine, to have it to reflect on that he was not poisoned with strychnine, or other noxious drugs. It is well known that there is more so-called Madeira drank in the United States, annually, than is made in any one year on the island of Madeira; there is more so-called Champagne drank annually in California, than is made in any one year in the province of Champagne, in France. The cultivation of the vine was commenced about twenty-five years ago, in Cincinnati, Ohio, and over two thousand acres are now in cultivation of the vine at that place; the sparkling Catawba is a fashionable drink with our American epicures and aristocrats; and Mr. Longworth, who first introduced the cultivation of the vine and the manufacture of wine, is now a millionaire. New York City, however, contains, within its limits, by far the largest manufactory of wine in the United States, and produces more varieties than even France itself; it furnishes, in the greatest abundance, Port, Madeira, Teneriffe, Malaga, Hock, and Champagne, and can, at short notice, manufacture Lachryma, Crista, Falerian, or Johannisberg. It should be the business of California, within the next five or ten years at the farthest, to dispense with wine altogether, or produce it themselves, and not be dependent upon a New York vineyard. The raisin grape, in all probability, will find a soil and climate in California congenial for its culture, particularly in the southern portion of the state, and its production would add materially toward retaining a portion of the gold our mines produce.

We have a country, too, peculiarly favorable to the raising of sheep and the production of wool. In many respects, California is assimilated to Spain, from whence originated the merino sheep, and no doubt exists that all the fine qualities of wool can be produced here equally as well as in Spain or any other country. In Spain there is a privileged company, composed principally of the nobility, who have the right of pasturage granted them on each side of the highway for hundreds of miles, and there are ten millions of sheep which are driven every year from the south of Spain to the north, in summer, and on the approach of winter are driven back again, to the south. In California every man is a nobleman, and would have the privilege of doing the same if he sees fit, and would not be obliged to pay a cent for pasturage.

The wealth of Vermont consists mainly in her sheep; but in Vermont it requires from ten to twelve tons of hay to keep a hundred sheep during the winter, and they must be fed some grain; that expense in California is saved. On the great prairies of the western states, food and shelter have to be provided for sheep during the winter season, which taxes the labor of the shepherd for five or six months; so that it is evident that in California the expense of raising wool (saying nothing of the first of the sheep,) is tenfold less than it is in the older states. The finest qualities of wool are grown in Australia, and

Australia sends to England forty millions of pounds of wool, annually. The business was only commenced there about forty-five years ago, and is now second to no other. The market for her wool is by a transportation of more than half the circuit of the globe. In California the shipment of wool can be made from San Francisco to New York, costing no more than would a land carriage of fifty miles. Experience has proven that sheep are more prolific here than in the older states, and liable to fewer diseases. It can be satisfactorily shown, that within the length and breadth of California we have the capabilities of growing one hundred millions pounds of wool annually, and then leave twenty millions of acres of land for the plow. In the palmy days of the missions of California, the old mission of San Gabriel possessed one hundred thousand sheep, which were mainly taken care of by the Indians. So profitable and lucrative do I conceive the raising of sheep to be, in this state, that I believe there are few, if any, of our most successful merchants, who have been engaged in business since 1849, but would be far wealthier to-day, if they had invested, at that time, the sum of five thousand dollars in sheep, and kept the increase to the present time.

The United States are heavily taxed for many articles other than those here mentioned, which cannot be grown in the older states, but which can be cultivated in California, whether profitably or not, it is true, is very uncertain, but which, by a little expense, can be reduced to a certainty. A new plant (the Chinese sugar cane,) has been introduced into the United States within a few years, and is now, for the first time, cultivated in California, and for which we are indebted to the agricultural department of the patent office. From numerous experiments in different portions of the United States, it is confidently believed that sugar and molasses can be advantageously and profitably made from it, and in sufficient quantities to furnish all which may be needed for home consumption. If this should be the case, it would save millions and millions of dollars which are annually sent out of the country. To California, which is now dependent exclusively, for what it uses, upon other countries, it will be almost invaluable; retaining within the state a vast amount of money, which is now sent out of it annually, besides contributing in making us more truly independent; and even if it cannot be successfully cultivated for the making of sugar and molasses; it is believed that it will prove of immense value for forage, and that if cultivated for that purpose alone, it will well repay the labor of the farmer; at least two crops can be raised in a year. I have known it, this year, to be planted on the tenth of May, and to have attained the height of ten and a half feet by the first of August; it was then cut down, and from the roots a second crop has sprung up, which is now six feet in height. This was on ground, however, having the advantages of irrigation. The experiment will be fairly tested this year, for it is stated that over one hundred thousand acres have been planted in the United States.

The almond tree I have mentioned before. It has been naturalized in the south of Europe, in the central and southern portions of the United States, and in California finds a congenial soil and climate. Its extensive

cultivation would be of great importance to the state. The amount of almonds imported annually into the United States, is said to amount to more than two hundred and fifty thousand dollars. It is a beautiful ornamental tree, useful as a shade tree, and profitable in the production of its fruit.

The cork tree is an evergreen, grown in Spain, and furnishes the well known article, cork; the climate and soil of California are adapted to its culture, and if this country is to be a wine growing country, it will be found to be essential and necessary. The amount of cork annually imported into the United States, is estimated at more than two hundred and eighty thousand dollars. The prune, a species of plum, would undoubtedly thrive here; and this fruit, imported every year to the United States, is valued at sixty-four thousand dollars. The date would find a soil adapted to its cultivation at San Diego, Los Angeles, and many other sections of California; it is a lofty tree, from forty to sixty feet in height, and a single tree will produce from one hundred to three hundred pounds of fruit. The tamarind, the fruit of which forms an important article of commerce, and is cultivated not only for ornament, but for use, in California would be an acquisition much to be desired.

The balm of Gilead tree is a native of Arabia, and grows spontaneously in the mountains of Yemen. This shrub or tree seldom exceeds fourteen feet in height; the balsam exuding from it is prized among eastern nations, both as a medicine and a cosmetic; it is valued so high as to be sold for twice its weight in silver, and its scarcity is such that it is believed there is not an ounce of the genuine article in the United States.

The quassia plant is a beautiful shrub, or low tree, and is sufficiently hardy to withstand the climate of England. It would flourish here, without doubt; the only objection that would be made to its cultivation, would be by the devotees of lager beer, for it is said the brewers use it instead of hops.

The Egyptian senna is cultivated in Italy, and would, therefore, thrive here; it forms a considerable article of commerce.

The tea plant, affording to millions of people a grateful beverage, and which, with us, has become almost a necessary of life, can be cultivated here, and is now raised in South Carolina. I do not suppose, however, we can raise it here as an article of commerce. If some of our enterprising merchants would import the plants, they would be eagerly purchased, and cultivated in every garden in the country, not merely for curiosity alone, but for use. One thing our tea drinkers would be certain of; if they cultivated it themselves, they would have a pure article, and if they chose to color it with Prussian blue, could do so or not, as they saw proper.

The coffee plant is well worth an experiment, like tea; it might not be raised for exportation, but there is no horticulturist, no farmer, but would take pride in cultivating it in his garden; and there is no lady in the land, but would take pleasure in treating her guests to a cup of that "which cheers, but does not inebriate," and which was cultivated by her own fair hands, and brought to maturity by the genial influences of the fervid sun and fertile soil of California.

The cultivation of rice, of which immense quantities are consumed in our state, and which forms the chief article of food for forty or fifty thousand of the almond-eyed celestials who are now sojourning among us, is a matter of the greatest importance. The tule land, now worthless, can, it is judged by persons well acquainted with the cultivation of rice and the ground suitable for its culture, be converted into the best rice fields in the world. The amount of labor required is nothing compared to what has been done in Holland, a greater part of which has been stolen from the sea. The high price of labor is the great drawback at present; this may not long continue, at least with a certain class of laborers. American miners have already had their curiosity sufficiently gratified by what they have seen of the Chinese, and what they have learned respecting their habits, manners and customs, and there is a strong probability that their numbers will in the mines be "beautifully less" ere long. If the Chinese should come to the conclusion to relinquish mining, as an unhealthy employment, there would then be plenty of laborers, and of the right kind for engaging in the business of rice cultivation. They would also furnish the right kind of laborers for the cultivation of indigo, which would undoubtedly thrive well in California, and prepare the way for the manufacturer.

The cotton plant, which is to the southern states what our gold field is to California, can be grown everywhere, from Shasta to San Diego; and if the old-fashioned spinning-wheel was now in use, a sufficient quantity could easily be raised for home consumption; but the same remark can be applied to the old motherly spinning-wheel, that was made by Webster concerning the United States bank; "it is an obsolete idea."

Tobacco (that weed which is an *indispensable necessary* of life,) can be cultivated here, equaling in flavor that raised on James River or in Cuba, and we can also produce enough of it for home consumption. There is infinitely more gold evaporated every year in tobacco smoke in California, than ever went up the chimney of Uncle Sam's mint in San Francisco.

The mulberry tree would thrive in almost every part of California, and its introduction and general cultivation would in a few years, in all probability, be attended with the happiest results. The manufacture of silk is dependent upon it, which, if commenced at first for the sake of novelty, may be continued for the sake of profit, and find employment for thousands of persons whose want of physical strength incapacitates them for more laborious vocations. Among the textile plants, producing fibrous material, which are worthy of experiment, are Manila hemp, New Zealand flax, the China grass, and Sisal hemp. I have read, in a work treating on the productions of California, written several years ago, that the natives of the country had ropes made of a sort of hemp or flax, infinitely stronger than any made of materials commonly used by us. If this, on investigation, should be found to be the case, it might be of immense consequence to the state.

Dyers' madder is extensively used in the United States, and its culture would be of national importance. The quantity of madder yearly consumed in the United States is estimated at from four to five thousand

tons, valued at a million of dollars; a sum paid annually for that which can be produced as cheaply and of as good a quality at home. The rich, alluvial soil, on the banks of our rivers, would be peculiarly adapted to its cultivation.

The great objection to the cultivation of many of the trees and plants I have enumerated, is, that it will require many years for them to mature, and that this is too fast a country for such slow operations. A beautiful story is told of an eastern caliph, who one day saw, as he was riding in the country, an old man bowed down with the weight of more than eighty years, engaged in planting a fig tree; the caliph laughed at his folly; the old man mildly told him that he was only doing for others what had been done for him. The caliph felt rebuked and passed on. Years rolled by, and the caliph was waited upon by the same old man, presenting to him a basket of figs, the product of the tree he had planted. He received the old man's gift with thankfulness, and gave in return a rich reward, at the same time observing that he had learned that it was never too late to do good.

A few years since, a distinguished English nobleman and his lady sailed in a yacht, on the ocean, built from English oak, raised from acorns planted by his own hands. The celebrated forests of England have all been planted by the hand of man; and her still more celebrated wooden walls, which so long have stemmed the battle and the breeze, are mainly built of oak planted by Englishmen, whose forethought extended beyond the present time, and who wisely provided for the future. Will not Californians be as patriotic, provident and thoughtful?

The attention of farmers should also be directed to the importation of improved breeds of horses, cattle and sheep, and all domestic animals whose use ministers to comfort and welfare. The public-spirited farmers of Kentucky, Ohio and Illinois, who, at an immense expense, have imported horses, cattle, sheep and swine, have added to the wealth of those states a thousand fold more than the first cost; but there are other animals not in common use, or known in our state, which can, perhaps, be profitably introduced into it. The United States government have imported fifty or sixty camels, which, it is expected, can be advantageously used for transporting commodities across our great plains and deserts. In Arabia, the camel is poetically called the "ship of the desert." In Tuscany, bordering on the Mediterranean, they were introduced two hundred years ago. The grand duke of Tuscany is the owner of two hundred and fifty, which, it is said, will do the work of a thousand horses. The lama, of South America, would undoubtedly thrive here; and in many parts of South America they are extensively used as beasts of burden in preference to horses and cattle. The tibet or cashmere goat was imported into South Carolina several years since, and would, in California, find a climate congenial to its habits. The ladies of California are interested in this matter. A real cashmere shawl now costs more than some fathers and husbands find it convenient to pay. But a California cashmere shawl would be a novelty; which the noblest lady in the state might feel proud to wear. The patriotism and enterprise of some of our wealthy Californians may, perhaps, make

the day when it will be worn, a not very distant one. All the domestic animals used by us in the United States, have been imported into it, and the number can, very probably, be increased, thereby adding to our comfort, wealth, and prosperity. To the enterprise of a California gentleman we are indebted for the honey bee, which already has been acclimated. There is no sting of reproach attendant upon obtaining wealth by such means. Teeming with animal life, as California is, and abounding almost to satiety with everything to gratify the taste and please the eye, yet we sadly miss the song of birds. Why cannot they, too, be imported? I do not mean the screaming parrot, nor the canary, brought to us from China, Germany, and other countries, to be kept imprisoned in cages, but birds which will make vocal our groves and orchards, and our wood-lands, to be imported from those countries where they are to be found, and given their freedom "to warble their native wood-notes wild." If this was done, they would obey the command given to man, (almost the only one he does obey,) to increase and multiply. I see no inseparable difficulty in the way. This may excite mirth, mayhap a sneer. It may be said, it is too trifling to be mentioned or thought of. But trifles make up the sum of human happiness; trifles have changed the face of nations. Little things, trifling in their nature, sometimes exert a great moral influence. A well authenticated anecdote is given of a man determined to commit a murder. He was on his way to accomplish the dreadful act. The warblings of a bird arrested his attention. It reminded him of his early childhood, when, an innocent boy, he reclined on the banks of a purling brook; in his own distant land; he thought of home, and the associations that clustered around it; he faltered, repented, and turned back; a changed and a better man. The rugged nature of man requires some soothing, softening influences; there is no son of toil so rude or rough, but, as he passes to his daily toil, would be cheered by the song of the lark in the morning, and who would not, when resting from the labors of the day, listen with delighted pleasure to the plaintive notes of the nightingale. The expense of importing hundreds, and I might say thousands of feathered songsters, would not be more than is incurred in supporting a corps of Italian vocalists for a week. This is an enterprise for the ladies of California to engage in. California men have too much of what they call the "stern duties of life," (speculation and politics,) to engage in a business unless it yields power or per centage.

The executive committee of this society have wisely offered prizes for floral culture. The love and taste for what is fair, beautiful, and graceful in nature, should be cultivated, for where it is found, there will be cherished a greater regard for propriety and good order. Domestic flower culture, the growing of rare and ornamental varieties and other plants, is an employment which should, under almost any circumstances, engage the attention of the lady, whether she lives in a cottage or a lordly mansion. The humble, lowly dwelling, with the rose and the honeysuckle twining on the walls, and flowers blooming on the window sill, is of much more interest than one costing an hundred-fold more, where nothing is to be seen but bare and gloomy walls of brick and

mortar; and the chances are that more intelligence, more kindness of heart, and more refinement, are to be found in the one, than in the other. The work required to cultivate flowers is peculiarly appropriate for the lady, whose daily vocations are of a sedentary character. The use of the spade, the hoe, and the rake, (I mean the garden rake,) is conducive to health, without which there is no enjoyment, and can be no true beauty. The culture of flowers and the study of botany, combined, thus occupying the mind and the body, will chase away ennui, beguile life of many of its cares, and may lead to pursuits of a more profitable character. The cotton plant, yielding more to the people of the southern states than our great gold field does to California, was first cultivated by a lady of Charleston, South Carolina, some sixty years since, as an ornamental plant.

There does not apparently exist the necessity for the farmer of California to pay much attention to the fertilization of his land, at present; but the experience of other countries where the soil has been equally as rich as it is here, goes to show that it cannot be neglected with impunity. Constantly taking off from the land, and never putting anything on it, will as assuredly produce sterility and barrenness, as constantly taking out of the meal-tub, and never putting in, will come to the bottom. This is exemplified in many parts of Virginia; lands which once richly repaid the labor of the farmer, are now comparatively worthless; they have already come to the bottom, for they paid no attention to manuring their lands. It has been often remarked, that good land makes poor farmers, and poor land makes good farmers. It is to be hoped that this will not be the case in California. When land is poor, necessity compels a man to do more than merely laboring with his hands; he finds that he must bring into action the best powers of his mind, and also finds that he must study agriculture, as a science. The natives of Chile and Peru, before the discovery of America, were well acquainted with the extraordinary qualities of guano, and applied it as a manure to their lands. It is only within the last few years that it has been brought into general use by the people of other nations, and hundreds of vessels are now employed in the business. Situated as we are on the Pacific coast, having easy access to islands abounding with guano, our enterprising merchants and farmers should turn their attention to this matter.

Let me now invite your attention to another subject — that of irrigation — which is intimately connected with agriculture. We have, within the geographical limits of California, over one hundred millions of acres of land, of which at the present time less than the one two-hundredth part is under cultivation, and that which is can be vastly improved. We have a mild and salubrious climate — so mild that many tropical fruits and plants can here be cultivated. We have a rich and fertile soil, tempting the labor of man. We have noble rivers and magnificent harbors, and in addition to which we have the richest gold field in the world; but we have only a population of about four hundred thousand inhabitants, and have not had as great an increase of population since 1848 as several of the western states and territories. We have,

beyond dispute, more than twenty millions of acres of land, which can be made suitable for cultivation, and twenty millions of acres more which can advantageously be used for pasturage. Were the great resources of California fully developed, it is capable of sustaining ten millions of inhabitants, finding full and ample employment in all the varied and diversified pursuits of life. But we have long seasons of drouth; we have millions of acres of land now unfitted for the plow, because the heavens do not give us the refreshing rain in due season; the winter of our vegetation is in midsummer. In that season, when we have been accustomed to see the earth clothed with rich verdure and blooming with flowers, we behold our hills and plains presenting a gloomy and forbidding aspect. Nothing more is wanting to make them put on the gorgeous livery of perpetual spring, than *water*. The want of it, for agricultural purposes, is the greatest and only evil the farmer labors under. How often have we all heard it remarked that, had we the rains of the old states, California would be the most glorious country under heaven. I am not sure, however, that the absence of rain for many long months is an evil. Providence orders all things for the best, though "parblind man" cannot see it. We should follow the advice of the poet:

"From seeming evil still educing good,
And better thence again, and better still,
In infinite progression."

We can render ourselves in a great measure independent of the seasons, but to do so we must render art subservient to the great advantages which we possess. We must do as has been done since the infancy of the world to this day, in other lands similarly situated to our own. We must lead the water which the thirsty earth demands, by means of canals and aqueducts, and spread it out over our now barren hills and dreary plains. Modern travelers and modern authors can scarcely credit the accounts given by ancient writers of the wondrous fertility of countries and of lands which are now wide, dreary wastes, and where once were cities the inhabitants of which were as far advanced as we are in many of the arts, and distinguished for their inventive genius. Many of their cities contained a population so large that our very largest would be thrown in the shade compared to them. Aqueducts, fountains, cisterns, wells and ruined canals are, in numerous instances, the only remains of some of the most celebrated cities of the old world. A distinguished writer says: "There are still standing some ruined and dilapidated columns in Persepolis and Thebes, but in Babylon, Tyre, Sidon, Palmyra, and many others, they are crumbled in the dust. But the cisterns and aqueducts, hewn out of the solid rock, still serve to excite the curiosity of the traveler and antiquarian, when every other monument of those cities has vanished." According to Chateaubriand, the pool of Bethesda, a reservoir one hundred and fifty feet by forty, constructed of large stones, clamped with iron and lined with flint imbedded in cement, is the only specimen remaining of the ancient architecture of the Holy City. Ephesus, too, is no more; and the temple of Diana, on which was lavished the treasures of the east, and which was

over two hundred years in building, and one of the wonders of the world, has vanished; while the fountains, which supplied the city with water, are as fresh as ever. The fountains of Bournabashi are perhaps the only objects remaining which can be relied on in locating the palace of Priam, on the site of ancient Troy. What causes have contributed to build up and depopulate those vast empires? Stern necessity compelled the people of those nations to direct their attention to everything which would develop their resources, to feed and clothe millions of human beings; to furnish them with all the necessities and luxuries of life, necessarily requires that millions of acres of land should be cultivated, and if that land is so situated that it will not as it is repay the labors of the husbandman, means must be adopted to render it available. The only thing there wanted, as with us in California, was the pure element of water. Nature had supplied everything else but water in the shape of refreshing showers. Art then steps in as the handmaid of nature, and produces, by means of canals, aqueducts and reservoirs, all that the parched earth demands to make it return its rich treasures as the legitimate fruit of science, labor and toil. Ages, long ages pass and roll away; foreign and intestine wars divert the attention of the rulers of the people, and the people themselves; their great works are neglected to maintain and support their great wars; canals, reservoirs and aqueducts go to decay; in the absence of water the land refuses any longer to repay the toil of the husbandman; and where formerly the olive and the myrtle grew, where luxuriant and rich verdure gladdened the eye has become a wild, dreary desert, where the sands, driven by the shifting winds, cover up and hide the monuments of departed wealth and power and glory. To make the now desert again to blossom as the rose, the self-same means must be resorted to as were adopted thousands of years ago by those whom we conceive dwelt in the infancy of the world, possessing none of the arts, the sciences and the refinements of civilized life. Babylonia, so Herodotus wrote more than three thousand years ago, was chiefly watered by irrigation. He further says it was the most fruitful of all the countries he had visited. And four hundred years after, the elder Pliny, speaking of the same country, observes "there is not a country in all the east comparable to it in fertility;" and in referring to the cause of its fruitfulness, he says: "the principal care required was to keep the ground well watered." "Some of the most stupendous works which the intellect of man ever called into existence were designed and constructed for the purpose of irrigation; work so ancient as to perplex chronologists, and induce some historians to class them among natural formations. Ancient writers unite in asserting that Lake Moeris was the work of men's hands; its great magnitude and prodigious extent has led modern authors to doubt its origin, although artificial works now extant equal it in the amount of labor required." The channel of the Nile itself has been altered. In the reign of Menes, one of the monarchs of Egypt, it ran along the Lybian chain of mountains—that is, one side of the valley of Egypt—and in order to render it equally beneficial to both sides, a new channel was formed through the centre of the valley, into which it was directed.

Egyptian husbandry now consists chiefly in having proper machines for raising water, and canals judiciously disposed to distribute it over their fields. The great importance of agriculture in furnishing food to man, induced legislators, at that early period, to devise means to promote it. This they accomplished by connecting it with the worship of the gods, and by classing the labors of husbandry among the most religious duties; this system was universal. Plutarch expressly states that some of the laws were designed to recommend agriculture as a part of religion. And perhaps it would be well for us, (in what we are pleased to call this enlightened age,) if some of the legislation of California, and some of the laws in our compiled code, had no worse object.

Permit me to turn your attention to what was done centuries ago, in South America, by its so-called barbarous inhabitants; not what is now done by the descendant of the civilized Spaniard, for even we, in this progressive age, can learn a lesson of wisdom from the acts and doings of the natives of that country. In the history of Chile, written by Molina, he observes, that previous to the invasion of the Spaniards, the natives practiced artificial irrigation, by conveying water from the higher grounds in canals to their fields; "many of the vales were well cultivated, having trenches of water." Baron Humboldt says the ancient Peruvians carried the system of irrigation to a great extent. He traced the ruined remains of a canal from the foot of the Cordilleras to the coast. The people had laws for the protection of water, very similar to those of Greece, Rome and Egypt, and all the older nations; for those who conveyed water from the canals to their own lands before their turn, were liable to the severest punishment.

In some parts of South America, rain is never known; contrivances to obtain and distribute water were, therefore, by the Incas, as with the kings of Egypt, the most important and constant objects of their care; examples are mentioned of Peruvians having conveyed small streams through a space of sixty miles, to irrigate a few acres of land. The seventh Inca from Mango Cape, constructed some water works, which, in their beneficial effects, perhaps equaled any similar undertakings in any part of the world. He caused a canal to be made, twelve feet in depth, and one hundred and fifty leagues in length; the source or head of it was in one of the mountains of that country, and traversed all the country of Rucanas, a province of Peru, and served to water the pasturage of those until then uninhabited lands, which are situated in a valley about eighteen miles in breadth, thus watering the best part of Peru. Many other works of a similar character are found in South America, all denoting the great attention which the Incas paid to agriculture—all displaying a wonderful degree of skill in their construction, and all contributing to the comfort, the wealth and prosperity of the country. The enlightened Spaniard came, and brought with him the arts and civilization of Spain—brought with him guns and gunpowder, and what was worse and more deadly still, *the fire water*; they sought to christianize the heathen; they paid no attention to their great works which only ministered to the wants of the husbandman; they took no pains to keep in repair the lands which the untutored Indian had made, and

suffered them to run to ruin, past recovery; they had no taste nor love for agriculture. In various parts of Mexico, evidences exist, which show the attention which was paid to facilitate agricultural operations. In the city of Mexico were many aqueducts; at Churubusco, (a name familiar with every American, and whose soil has been maintained with the blood of our gallant soldiers,) was a vast aqueduct and stone reservoir, the work of Montezuma, which was destroyed by the ruthless Spaniards. We cannot but lament that the ambition of the Spaniards led them to destroy, and not to construct or build up. Their present and past history is a melancholy commentary upon that folly which led them to sacrifice everything to their thirst and passion for gold.

It is always well for us to look into the past history of the world, and profit by the examples and conduct of other nations; but it is not necessary for us, so far as we are concerned, to refer to the past; we can turn our eyes to other lands, similarly situated to our own, and judge for ourselves. What Italy is to Europe, California in many respects can be to the United States. It is now, in fact, the Italy of the United States, so far as climate is concerned. In Milan, one of the most favored spots in all Italy, it is boasted that they have two hundred days in the year of clear, cloudless skies. According to meteorological observations of Dr. R. K. Reid, at Stockton; there were in 1853, only forty-eight cloudy and rainy days; the remaining three hundred and seventeen were clear, with a bright sun. In the wonderful fertility of the soil of California, it will bear a comparison with Italy, often called the garden of the world. But we have not the population of Italy, neither have we, at present, the capabilities of supporting such a population, because we have not the similar means for irrigation, and as a natural consequence, cannot bring into cultivation a sufficient quantity of land to support and maintain it.

Italy, then, presents to a Californian interesting subjects of inquiry; particularly northern Italy, in the provinces of Lombardy and Piedmont, where the irrigation of lands has been carried to a great extent. In Piedmont, the whole area of the plain belonging to the state contains one million three hundred thousand acres of land, of which less than one million are susceptible of cultivation. The total irrigated portions of Piedmont amount to four hundred and eighty-three thousand six hundred and thirteen acres of land; consequently, only one-third of the plain of Piedmont is irrigated. The total quantity of water required, amounts to eight thousand two hundred and ninety feet per second, and it is calculated that the increased rental of land, caused by irrigation, amounts to one million five hundred thousand dollars per year. In Lombardy, about one-sixth of the whole plain, or one-fifth of its productive area, is under irrigation—the area under summer irrigation being one million and sixty-one thousand acres. The increased rental of land in Lombardy is estimated at two million eight hundred thousand dollars a year. In this province alone, there are over four thousand miles of canals constructed for the sole purpose of irrigation, being a complete network of canals, and are compared by a writer to the veins and arteries of the human system. These canals in Lombardy

have cost over two hundred millions of dollars, but the increased rental of land alone; justifies the outlay, besides being instrumental in developing all the other resources of the country; they have clothed the country with perpetual verdure, and given healthy homes to nearly two millions and a half of people. Many of the canals of Italy are constructed solely by government; others by individuals, assisted by government, and others again, by individual enterprise alone. One of the largest canals constructed by individual enterprise, is the Cavo Lerino Marcoco; it carries a volume of water equal to two hundred cubic feet per second, and flows in a northeasterly course from Milan toward Lodi; its length, including the various branches, is about one hundred and fifty miles, and it is now a source of immense income to the descendants of the original projector, whilst to the inhabitants of the country it waters and renders fertile, it is invaluable. In the undrained marshes of Italy, water is the cause of desolation and misery; in the plains of Lombardy and Piedmont, it is the fountain of rural wealth, the promoter of industry, and the fosterer of a dense and flourishing population. We have here, spread out before us, the San Joaquin plains, and the noble river of the same name, flowing through them, into which empties the Stanislaus, Tuolumne, Merced, and other rivers. Here we have a tract of country over which are now roaming bands of wild horses—a country greater in extent than the plains of Piedmont, and can bring under a system of irrigation a larger amount of land, and which will then be capable of sustaining equally as dense a population. The great Sacramento valley, watered by the Sacramento River and its tributaries, may be compared with the plains of Lombardy. But if Sacramento and Stockton shall ever become to California what Milan and Florence are to Italy, it must be when these great plains are studded with cottages and villas, and which will not be until the waters which flow through them are distributed over their surface.

Let us further turn our attention to what has very recently been done in British India, and by Englishmen. In England, water is in excess, and draining is the chief instrument of fertilization. In India, water is in deficiency, and irrigation is there the chief means of fertilizing the land; and in some years, the only means of rescuing it from entire barrenness. In no country is more attention paid to agriculture than in England. The love and passion for agriculture is deeply implanted in their natures, and wherever they go, and in whatever land they dwell, they carry with them a devotion to agriculture. One hundred and fifty millions of native East Indians bow to the sway of the British scepter. By very many Americans, and intelligent foreigners, the rule of England, in India, is looked upon as tyrannical and oppressive. It may be so. Great power is apt to be abused, and in every country under heaven, it has generated oppression, tyranny and corruption—always excepting California. The fact and truth is, that the British government have done more to improve the condition of the natives of India, within the last fifty years, than was done by their native rulers in centuries before. The canals which they have caused to be constructed within that time, have opened for cultivation immense tracts of land which

had never before known the labor of man. The waters of the Ganges and the Jumna are taken from their natural beds and spread out and distributed over plains which before were dreary wastes. The canal west of the river Jumna, is the largest canal in the world. It has a length of course ten times greater than any in Italy, and its area of irrigation is five times greater. The income of this canal is over one hundred and fifty thousand dollars a year. With the Ganges canal, the greatest in Italy will stand no comparison. There are, in truth, no works in renowned Italy which approach those already erected and in progress of erection in northern India. In the Gunttoor district, in the year 1833, the periodical rains failed entirely. This district was not then under irrigation. It contained five hundred and twelve thousand inhabitants, of which two hundred thousand, it is believed, died of starvation and the fever which followed it. To prevent the occurrence of such a calamity again, a work of irrigation was ordered by the board of directors in India, which would insure a permanent supply of water for a great extent of land. The estimated expense of this work is seven hundred and seventy thousand dollars. There are very many works in India of this character. Some of great extent, constructed by the ancient rulers of the country, many of which were out of order, but which the government has been actively engaged in repairing.

The most striking effects of the extension of irrigation, and of the application of engineering skill, are found in the Delta of Godairra. Previous to the year 1844, the revenue of this province was declining, the people were impoverished and dispirited, when a plan for irrigation and distributing water by a network of canals, over an area of three thousand square miles, was projected. In the year 1851, over seven hundred thousand dollars had been expended, and it was calculated that it would require five hundred and fifty thousand dollars more to complete the work; yet such had been the effect of the employment of capital and labor, and the stimulus given to an impoverished district, that each year, as the work went on—even at the very first year—the revenue increased, and was greater, after deducting the sum expended, than the average of the preceding eleven years. This is not a solitary instance; thirty-nine works are enumerated, which have been executed in India from 1836 to 1849, three of which, from various circumstances, have not been remunerative. The remaining thirty-six have afforded a profit on the money expended on them; and this to such an extent that, taking the loss with the profit on the whole thirty-nine, not less than sixty-nine and a half per cent. on the cost is repaid yearly. California ditch companies, incorporated and constructed for the purpose of aiding the miner in washing out gold from the auriferous earth, have not been quite so remunerative to the stockholders. The court of directors of India, a number of years ago, sent a competent person to Italy for the purpose of examining her great works of irrigation, and making a report respecting them; and if some of the money which has been expended in California in printer's bills, had been so applied, it would perhaps have been invested fully as much to the benefit of the state. Great as are the works constructed in India, it is now generally acknowledged, by well informed

Englishmen, that they are paltry, compared with what the country demands, particularly in Madras, containing one hundred and thirty-eight thousand square miles of land. The great income derived, and other advantages, are altogether irrespective of the increased and less fluctuating supply of food and employment for capital and labor; of the stimulus given to the exertions of the population, and of the moral effects of plenty, occasioned by facilitating their improvement.

Having curiously and very imperfectly taken a sort of bird's-eye view of works constructed for the purpose of irrigation, in various countries of the globe; having shown that, in those countries, the results arising from their construction have been of the most beneficial character; that without them whole nations would almost be depopulated; that gaunt famine stalks where water cannot be had to fertilize the earth, and that where it is found, and is distributed, it is unknown; it only remains to inquire whether a system of irrigation, to develop the great agricultural resources of the state, commensurate with its extent, can, and ought to be adopted? Again—does the country and the climate demand it?

In northern Italy, where irrigation is carried on to the extent I have described it, making Lombardy and Piedmont a garden, there falls, on an average, thirty-two inches of water yearly. In northern India, where also irrigation is demanded, because without it the country would be a desert, there falls, on an average, forty-eight inches of water annually; but this fall of rain is, as with us, very unequal, and all of it in the course of two or three months. According to meteorological observations made at San Francisco, from January 7, 1850, to January 7, 1857, by Dr. Henry Gibbons, the mean fall of rain in each year during that period was twenty-one and seventeen one-hundredths inches; the greatest fall of rain was in 1855, the least in 1851. According to this table of Dr. Gibbons, there was in 1853 nineteen and three one-hundredths inches of water that fell in San Francisco; but according to a register kept by Dr. Reid, of Stockton, there was but twelve and one-sixth inches of water that fell in Stockton in that year; and it is well known that in each and every year there is more rain that falls on the coast range than in the interior of the country; there is also much more rain in the latitude of San Francisco and Stockton than in Los Angeles and San Diego. A writer in the "San Diego Herald" says: "It is well known, to every one who reads, that the absence of rain this season has completely destroyed all crops in the country. Not one solitary blade of barley, wheat, or other cereal, is left; every blade of grass this side of San Bernardino is parched up and withered." California, so old Californians say, has had some seasons of drouth infinitely more severe than has occurred since 1849; thousands of cattle and horses have perished for the want of water and food. These seasons may never recur; it is rather too presumptuous in us to say that we can Americanize the climate of California; there is a limit to Anglo-Saxon ability, though we are not much inclined to admit it. Now, with a more dense population, should we have a recurrence of similar seasons, should we have no rains falling from the heavens to enable the farmer to plow and to sow, there may possibly be great suffering, there may be famine

in the land—gold will not always procure food and water. But even if we had no reason to anticipate such seasons of extreme drouth, yet we have had no season since 1849 when an additional quantity of water was not wanted by the farmer, and if more land is to be brought into cultivation, it is indispensably necessary; it is a great matter of doubt whether we can bring into cultivation as much more land as is now cultivated, without resorting to irrigation; and by resorting to irrigation, at least twenty millions of acres of land more can be cultivated. We can then, in a great measure, be independent of the seasons.

Every one who is acquainted with the topography of California knows that the conformation of the land is admirably fitted for irrigation. We have, as in Italy, our snow-clad sierras; we have bold, rushing streams issuing from them; the summer's sun melts the snow, and an ample supply of water can be had to irrigate the plains of Sacramento, San Joaquin, and the thousand other plains and valleys of California. When the celebrated Brindley (who has immortalised his name by the construction of the famous Bridgewater canal, in England,) was examined by a committee of the House of Commons, he is reported to have said "that the only utility of rivers was to supply canals." In California it is still more evident than in England—if our river beds were drained dry, and the water that runs in them distributed over the land, the whole country would be a garden.

Our state is not the only one that suffers from drouth and from want of water in due season to enable the crops to mature. Only two years ago, in the year 1855, there was a severe drouth in the United States. Great distress followed it. Thousands in the great cities were, in the succeeding winter, in want of food, and thousands were asking of their fellow-men for leave to toil. Horace Greeley, of the "New York Tribune," said that the loss to the people of the United States, by the drouth, was, in that year, a hundred million of dollars. If this statement was true, or if it approximated to the truth, might it not be well for the older states to also turn their attention to rendering their country somewhat independent of the seasons? For if one hundred millions of dollars have been lost in one year, by drouth, and the expenditure of a hundred million of dollars would prevent a similar loss in other years of drouth, (which may frequently occur,) it would certainly be profitably and economically expended.

I shall be met by the objection that an extensive system of irrigation requires an immense outlay of capital. Granted. It will require millions of dollars. To develop the agricultural resources of the state to their utmost extent, may require more than two hundred millions of dollars. It is not expected to be done in one or two years. The present wants of the country, perhaps, do not require it, at least if we have no greater population than we have at present. But if it is desirable to have an addition of nine or ten millions to our population, it will also be found advisable to have nine or ten millions of acres of land in cultivation. The work should be commenced; at least the foundation laid this present year, and it may pay for itself as it progresses, if government displays the same liberality in making grants of lands for canals

in California that they have done in the older states for the making of railroads. If they will give every alternate section of land, the work can be commenced on a sure basis. If, in addition, our great land barons will give one-half their lands for this object, thereby making the balance of tenfold more value; their *disinterested liberality* will help the work along. But government could well afford to give every foot of land it has in California, and then save money by the operation; for it will cost more to survey and sell it, than will ever be refunded to the United States treasury, unless a great moral revolution should take place.

When there is a will, there is a way, and that way the Anglo-Saxon Californian can find. We belong not to that race who always see a wolf in the path, and if there is one, it is bound to stand aside. Capitalists and shrewd speculators may learn a lesson from the Central Railroad Company in Illinois. The land that was donated for building the Illinois Central Railroad, more than paid for it, and the company are now in receipt of an immense income, from a work which cost fifteen millions of dollars, but which did not cost the company one dime.

The great works constructed by the miners for the purpose of bringing water to mining grounds, and which have cost nearly if not quite twelve millions of dollars, show that almost insuperable obstacles can be overcome by determined will, assisted by science and art. Rivers, ravines and mountain gorges are crossed, and hills either leveled or tunneled through, and water conveyed to almost any desired locality. Their canals and flumes also show that the water in the mountains can be used for other purposes than mining. There are hundreds, nay thousands, of little patches of land which are now irrigated with water brought in mining canals and flumes. It is also shown that agriculture and horticulture can be carried on successfully wherever water can be obtained—that no soil is so barren and no hill side so steep but if water can be had it can be cultivated. The environs of many of our mining towns now present a different aspect from what they did three years ago. Most of our mountain towns are now plentifully supplied with water, and the good sense and taste of their inhabitants are manifested in building neat and beautiful cottages, and surrounding them with useful and ornamental trees and blooming and fragrant flowers. The dwellers of the plains must look well to the laurels they gather at this exhibition, or they will be snatched from them ere long. In the rich fruits of California, in vegetables and in flowers, they may expect to meet with an earnest competition from the mountains hereafter. And if they neglect to do for the plains what the miners have done for the mountains, they may look to see the miners supplied with their breadstuffs raised contiguous to land where they raise their gold. To the philanthropist and the moral philosopher, the divine and the statesman, there is another view of the subject. Everything which contributes to increase and perfect the natural productions of the soil, and to beautify and adorn it, exerts a healthy moral influence, which can be proved by the criminal calendar of many of our mountain towns. In a mining town well known in California, there were, it is said, twenty murders committed in twenty consecutive weeks in the year 1861. Then there was not a tree, plant

or flower cultivated in or near the town; now that same town contains four times the population it did then, and presents a scene of rural beauty not often surpassed, and in strong contrast to what it did in 1851. And there has not been a homicide perpetrated in that town within the last two years. The best criminal code which was ever devised, and the most stern and inflexible administration of the laws, will not prevent the commission of crime, and do not in fact, contribute to prevent it as much as the thousand moral influences which can be brought to bear on the mind and conduct of man; and in generating those influences, the farmer, the gardener, and the florist, do more than the world in general is willing to give them credit for.

No country on the globe presents a wider scope for the employment of well directed energy and industry, or offers stronger inducements for the investment of capital, than California now does; and greater triumphs remain to be achieved by the farmer, the mechanic and manufacturer, and even the miner, than have ever before been witnessed; and it is mainly to their exertions that California is to be indebted for her true glory and prosperity. It is now unfortunately the case, that no one considers himself settled down for life; we are too much like wandering Tartars—here, there, and everywhere; the great object is to make a few thousand dollars, and return to the older states. There can be no good farming under such a migrating system. The farmer should lay his plans for years ahead; should do this year that which will ensure to the benefit of himself or his posterity for long years to come. Very many Californians have made their thousands and returned to the older states; they remind me of the anecdote of the farmer, who saw a lad stealing into his orchard; he halloed out: "Where are you going, Sawney?" "Bock agin," was the prompt answer. So it is with these returned Californians; they spend a year or so, gaily, (that is, those who live over the winter,) sport their California jewelry, particularly their specimen breast-pins, until the last gold coin in their purses, like the last rose of summer, reminds them of California, and then it is "bock agin." There is not a word to say against young men who return for the purpose of bringing to California "the girl they left behind," as a wife. I wish a fund was created, ample enough to send every young man back for the same purpose; it would create a better and a happier state of society, although we should have squally times in the course of the year. Much importance is attached to the Isthmus communication between California and the older states. The companies incorporated for the purpose of furnishing a transit across the Isthmus, have become so consequential as to make themselves believe that the weal or woe of California depends on them. I have sometimes thought that it was a pity there was such a communication at all. Their charges are so high, that a great majority of the immigrants who come to the state by the way of the Isthmus, come with gloves on their hands, and are very loth to take them off when they arrive here.

Almost all our office holders and office seekers, professional men, and professional gamblers, come by the way of the Isthmus. The bare-handed immigrant, with an ox whip in his hand, and a rifle on his

shoulder, when he arrives in California takes hold of the pick or the plow, and is not afraid nor ashamed to use them. The money that has been spent by Californians in traveling backward and forward, within the last eight years, would, if it had been expended in the construction of canals, have irrigated every foot of land on the San Joaquin plains. By devising a system to develop to the utmost extent all our vast agricultural resources, and giving evidence to the world, by our acts, that it will be carried on and persevered in—that no obstacle will deter, and no difficulties discourage us, until it is brought to a successful termination, we shall present the strongest possible inducements for those who are here, to remain, and such an impetus to immigration will be given, that nothing can withstand; such a stimulus to labor will be given, that there will be no waiting the slow action of Congress on the Pacific and Atlantic railroad question, a question which may make a dozen presidents before it is completed, and half the number before it is begun. We will not be dependent for a population on two or three incorporated companies on the Isthmus, and should government give no aid by the establishment of military posts on the route between the county of Pike and California, western men, with western rifles, will open a path, and help us to build up not merely a few palatial structures, but happy homes for a great and numerous people.

In conclusion, let me venture a prediction, that on the return of this festal day, in after years, when the prattling little ones who are now among us shall have grown up to be stalwart men and bonnie lassies, the orator of that day will look over a vast concourse of people, mainly clad in the manufactures of California. He will congratulate them on the advance of the arts and sciences—that no longer the slow-moving wagon was propelled by animal power, and was daily crossing the Sierra with railroad speed—that some motive power other than muscular force prepared the ground to receive the seed from the hand of the farmer—that California canvas was spread to the breeze in every port and harbor in the world, carried by the vessels of our merchant princes—that the hills, valleys and plains of California were clothed with perpetual verdure—were studded with cottages and villas, the abodes of peaceful and prosperous industry, and that, under the benign influences of religion and the general diffusion of education, the sun in his daily course did not look down upon a people who had greater reason to raise their voices in thankfulness to the great Ruler of nations for the innumerable blessings they enjoy.

COMPETITION ESSAYS.

ESSAY ON THE ALKALINE SOILS, TULE LANDS, AND SALT MARSHES OF CALIFORNIA.

BY WILLIAM THOMPSON.

FORMATION OF, AND MEANS OF SUBDUING, SALINE SOILS.

The most careless observer, as he travels through our golden state, cannot fail to perceive that it has undergone striking changes in its geological conformation and aspect, and in no small degree, when he directs his attention to the lands adjoining some of our bays and rivers. To this latter portion of its geology, the subjects on which I am about to treat more particularly confine me. Several of the rivers show unmistakable indications of having run at one time at a much higher level. (See Appendix, Note 1.) Lakes have evidently existed where now we have extensive plains; and the bursting asunder of the present outlet of the Sacramento and San Joaquin, at their entrance to the ocean, is a fact which, few will be inclined to dispute, who cast but a casual look at the identity in composition of the rocks on the opposite sides of the Golden Gate.

How far the level of the ocean itself has undergone a change, we cannot affirm with so much confidence. Deposits of oyster and muscle shells are found on the margin of the bay of San Francisco, which appear altogether too extensive to attribute to their having been collected by Indians. Many of these deposits are considerably above high water mark; and what is more corroborative of the theory of those who suppose them to have been natural deposits, in no instance which has come within my own observation do they reach above a certain level, being about that of the stretch of low land which skirts the northern boundary of the Sanchez rancho, where the entrance to the bay must have been previous to the bursting open of its present entrance.

But whether or not we feel disposed to attribute the existence of the salt marshes around the bay of San Francisco, and, in many instances, a far way inland along the rivers, to an elevation of the sea coast, we can easily account for their continuing in the condition in which they are, from their being in a swampy state; by means of which the saline matters with which they are impregnated, being in a state of solution, are retained in the soil, as water is retained by a sponge; while the greater portion of the rain-water which falls on such marshes in winter,

and makes them more wet for a while, does not run off; and during the dry weather of summer the continuing moisture of the marsh is only partially dried up, (See Appendix, Note 2,) without the salt with which such soils are poisoned being evaporated along with it; a fact which is clearly exemplified in the manufacture of common salt.

A similar theory, and one in many instances no doubt the true one, would account for the formation of salt marshes, without having recourse to the supposition of a higher sea-level. The returning tide leaves on the low marshes along the rivers a portion of its oozy mud, which the suns of summer soon render comparatively dry. The brackish water forms an almost imperceptible incrustation of salt on the surface, which, during evaporation, it clings to as long as it can, but cannot carry along with it. The high water of next tide contains the same minute portion of salt which the former did; the soil also has received a little on the former occasion, which it has no disposition to part with; and salt water having a greater specific gravity than fresh water, the greater its saltness the greater is its disposition to sink into the soil, and gradually get further inland by usurping the place of water having less density. In consequence of which, salt marshes must necessarily increase in saltness to a certain point; and all the land within such influence, which is in that spongy and undrained condition which makes it retentive of an undue proportion of water, after a time becomes equally salt.

But besides such salt marshes, which are to be found in every maritime country, we have in California another kind of barren soils, which are formed in a somewhat similar manner—the alkaline soils (more properly so called.) To quote my own words, “There is little doubt in my mind that those soils are formed from decayed feldspar and mica, conjoined occasionally with magnesia and metallic oxyds and lime in its different forms of combination—the principal alkali, in many instances, being formed from the rapidly decaying granite of our hills and mountains. Granite, as every one knows, is generally composed of quartz, mica and feldspar, of which constituents the first is nearly pure silica, but the two latter are more compound in their character, and both contain a large percentage of potash. (See Appendix, Note 8.) Besides, the granitic rocks of this state owe in a great measure, as is well known, their rapidly decaying qualities to the iron which they contain; which, when oxydized, has all the qualities of an alkali, so far as its operation on plants is concerned.

“That the components of alkaline soils are frequently furnished from the decayed granite of the mountains, there can be little doubt; and the lover of nature, as well as the man of science, may find a pleasure in observing from the different trees on the banks of our rivers indications of the difference in the soils on which they grow. High up in the mountains, where the rivers take their rise, the red-wood and the pine find among the granitic gravels, where they are but little decomposed, enough potash to supply their moderate wants. As we follow them in their downward progress, where the country has become more level and a greater quantity of the components of rocks are in a soluble state, and consequently available in greater abundance for the growth of plants,

the place of the red-wood and pine is occupied by the oak, a tree whose ashes contain more than double the quantity of alkaline salts which the others do. Further down we find the lime and different varieties of willows, which are still richer in alkaline matter than the oak. (See Appendix, Note 4.) Below this the soil frequently gets too alkaline, and we only find the bitter, acrid plants, peculiar to alkaline plains.

"Now there are two things which contribute greatly to the formation of alkaline soils; one of which is, the great solubility of potash in water, and the other the extreme levity of the scales of mica. By means of its solubility, which is so great that potash will dissolve in its own weight of water, (See Appendix, Note 5,) and in consequence, if I may so speak, of its particular attachment for it, which is exemplified by its attracting a sufficient quantity from the atmosphere to render it liquid, thus constituting what the older chemists called *oil of tartar per deliquium*. The potash contained in the decaying rock has an invincible tendency, on getting free from its former associations, to get dissolved in water, with which it continues connected; and thus, during the heavy rains of winter, some of our springs and rivers may be considered as a very weak solution of potash, etc. Some of the former remaining so at all times, the solution only getting stronger as the heat of summer dries up and diminishes their former supply of water. As the rivers rise they overflow their banks, and in some situations leave, along the lower portions of level plains, sheets of water of considerable extent, where, having no outlet, it necessarily remains, till evaporated by the sun. The quantity of alkaline matter which is thus deposited in one year may be very small, but in the course of ages it accumulates, and soils are thus rendered barren from an excess of those very alkalis which, in less quantities, are essentially necessary to the growth of plants. The other reason to which I referred, namely, the extreme levity of the scales of mica, by means of which they are transported bodily, without dissolution, is equally capable of producing a similar effect; (See Appendix, Note 6;) for if, as Klaproth found, they contain a seventh part of their weight of potash, we need not wonder at their constituting, in locations where they have become decomposed, an alkaline plain, incapable of growing ordinary crops.

"Another cause of barrenness, from an excess of alkaline matter, in places which otherwise would have a different character, is their being poisoned by such alkaline springs as I mentioned above, deriving their qualities from the disintegration of granitic and feldspathic rocks, with which the rain, as it percolates through the soil, comes into connection; or more frequently, perhaps, from its finding below the surface old deposits of alkaline matter in a soluble condition."

Thus we have two kinds of soils, analogous in their character, though differing in their composition. But soils are also to be found partaking of the nature of both. This was to be expected. If alkaline soils are formed from disintegrated rocks, the saline ingredients of which have been deposited on the margins and at the mouths of rivers, which the tide flows up; the soil on their banks is not only composed of such alkaline ingredients, but is also impregnated with salt water. Again, it

will be found that the tule lands consist invariably of one or other, or both of those soils combined, and that the tules which grow on them are not only an indication of land which at certain seasons of the year, at least, is covered with water, but also of a soil containing a large proportion of saline ingredients, (See Appendix, Note 4,) which it does not have, it is true, in the same proportion as the others do, but which, if such lands are incautiously drained, without provision being made to have them also irrigated, might be found, in many instances, to be highly inconvenient. The three are soils *ejusdem generis*; they only differ in degree. Hence will appear the propriety of including the whole of those lands and soils in one treatise. I hope, therefore, to be exonerated from the supposition that I am merely actuated in doing so by caprice.

In treating of the method, or methods, of overcoming the excess of alkaline and saline matters with which such soils abound, it has been suggested that science ought to be able to explain how, by neutralizing their too active qualities, the desired object may be accomplished. I confess I have but little faith in its being thus effected; and I believe, among the scientific farmers of New England and Europe, the mere discussion of such an argument might be looked upon as ridiculous. Still, as the matter is of great importance to the state of California, and the reclamation of the lands and soils which are thus rendered barren is likely, in many instances, to be undertaken by enterprising companies, composed probably of men who are not themselves practical farmers, I consider that I engage in no empty duty in attempting to investigate it.

In reclaiming lands from the sea, it frequently takes a long time before they are capable of growing ordinary crops, and it is usual not to attempt to do so till the natural appearance of white clover (which contains an unusual quantity of alkaline matter,) gives indication that the salt, with which the soil was impregnated, has been sufficiently washed out to admit of the cultivation of potatoes, which also contain an unusual quantity of alkalies. (See Appendix, Note 7.) But to render such soils more suitable for the growth of cultivated crops, the application of lime is found of the greatest advantage. Now it has been found, by the experiments of Mr. G. Johnson, that by mixing salt and lime in the proportion of two parts of the latter and one of the former, a decomposition of the elements of salt takes place, and muriate of lime and soda are formed. This would show the *rationale* of how lime is useful as a manure for soils having in them an excess of sea salt. For thus, (See Appendix, Note 8,) in consequence of its decomposition, and the chlorine with which its sodiac base was connected having formed a new connection with lime, the plant has little difficulty in finding its mineral constituents in near approximation to the quantity in which it requires them, (See Appendix, Note 9,) and consequently grows vigorously on a soil which, except it had been so treated, would have been unsuitable for it. For our alkaline soils, again, charcoal has been said to have proved a valuable auxiliary; and the *modus operandi* of its proving serviceable has been accounted for from its pores getting filled with the alkaline matter of the soil. That charcoal possesses such ab-

sorbing powers, I am not disposed to deny; and every one must admit that every ounce of alkaline-matter thus absorbed would render the quality of the remaining soil so much the less active. But the object to be accomplished is too great to be thus overcome; and such applications need not be attempted till the soil shows that it has been otherwise so reduced as to be capable of growing white clover. (See Appendix, Note 10.) In fact, it will be found that those soils contain the saline matters with which they are impregnated, in great excess, and that such applications, from the small proportion of the remedy which can practically be applied, can only be beneficial when the excess is also small.

The true way, as it appears to me, is to make nature retrace her steps. We have seen how those soils in all probability have been formed. Let us see whether we cannot, by reversing the process, undo what proves to be amiss. But, in the first place, we must prevent the evil from accumulating. If the soil is rendered barren by large quantities of water, impregnated by alkaline salts, being left on it by a portion of the retiring floods remaining *in situ* till the heat of summer evaporates such water and leaves the salts behind, we must erect embankments to prevent such overflows in future. If it is a salt marsh, rendered barren by being exposed to the influence of salt or brackish water, we must have recourse to similar means of prevention. If a tule swamp, at all times or occasionally rendered unfit for cultivation in consequence of the water of lakes or rivers, we must also erect embankments, for similar reasons. Thus, embanking, under almost all circumstances, becomes necessary as the primary step in any attempt to reclaim such lands—being equally wanted to guard against the accumulation of the evil; and, after we have succeeded in banishing it, to prevent its return. This, however, is merely introductory labor, and in the case of the alkaline and salt water soils, at most but an auxiliary to the accomplishment of other objects by other means.

Thus far the different soils, on which I have undertaken to write, may be generalized and treated on in conjunction; but it is to be presumed that something more is expected than merely to furnish general remarks. The public look for special information from men of experience, who can also bring to bear the investigations of science on each particular subject, so that their remarks may be of practical utility. It therefore becomes requisite to take up the different subjects in detail, and discuss them separately, the moment we proceed to point out the means which ought to be resorted to for overcoming the peculiar obstacles and incumbrances with which, in each particular case, we are beset. I propose, therefore, in proceeding with the practical details of the best means of reclaiming such lands, and rendering them productive, to follow the course very properly pointed out by the Agricultural Society.

In the first place, let me advert to the mode in which I propose to deal with

THE ALKALINE SOILS.

Keeping in view the facility with which carbonate of potash is dissolvable in water, and also that it forms a principal ingredient in alka-

line soils, and that our saline soils in general, however composed, have been formed by certain salts which had been dissolved in water having been deposited on and in them, by the evaporation or departure of the water in a less salt condition than it came. If we wish to employ nature to undo her untoward acts, and unwind the tangled hasp which is placed in our hands, let us be careful not to break the thread; as otherwise we may get lost in the labyrinth which, as it proves the only means of enabling us to explore, it may also show us how to demolish. It is evident that if we can so far make nature reverse her proceedings as to get the water, which is brought upon or falls in rain on such soils, to leave in a saltier condition than it came, the object would be accomplished; and the greater the difference thus produced, the sooner it would be effected. The greater also the quantity of water which we can render available for such purposes, so much, in proportion, would the desired object be accelerated. The whole matter resolves itself into a question of time, after we have got nature properly set to work. That such (to speak figuratively,) has been successfully done for similar purposes, we have good and sufficient testimony. "From the middle of Belgium," says the patent-office report for 1855, "a few miles north of Brussels, the country northeasterly becomes almost entirely a dead level. For the purpose of securing their territorial possessions, the early occupants of this country had recourse to dikes or embankments, high and strong enough to protect them, under ordinary circumstances, from the tides; and placing wind mills on those dikes exposed to the sea breeze, they worked the pumps which drained the inclosed lands. The Netherlands now present to our view an artificially constructed country, some portions of which are many feet below the level of the sea, and nearly all too low for natural drainage." And such improvements are not merely events in the past history of the Netherlands. The object of the article in the patent-office report, to which I refer, is to give a description of the draining of Haarlem Lake, which has recently been effected by the industrious inhabitants of Holland; by means of which, according to the calculations in that article, a population of seventy thousand souls may be supported. In this latter case, as it must have been in many others, the alluvial bottom of Haarlem Lake, which every one knows was a salt water lake, was impregnated with saline matter, which necessarily prevented the soil from growing ordinary crops till it was washed out by the rains of heaven or by irrigation; (See Appendix, Note 11;) for, in that country, in reclaiming lands from the sea, the inhabitants have hitherto placed their reliance on overcoming this difficulty by no other means; at least until the original salineness of such soils had thus been very much reduced. In England, irrigation is seldom resorted to to aid in such an object; but though it often takes a long time before such land is in a suitable condition for growing ordinary crops, and the object can only, in many cases, be attained by the outlay of a large amount of capital, their extraordinary fertility, which would seem to be inexhaustible, induces the proprietors of such lands, in almost every instance, to expend whatever money and patience may be wanted for its accomplishment.

In proposing, therefore, to assist nature in undoing what she has done amiss, it will be seen that I am advocating no novel theory, but good, sound, tried and conservative principles, the result of universal experience, and the only means which have hitherto been adopted with success, or which I believe among practical men have ever been attempted, with the exception of mere auxillaries, after such soils have been gradually reduced.

I would take this opportunity to mention, that to ask an experienced farmer to prove to the satisfaction of those who are merely amateurs why this or that supposition may not be substituted for the experience of ages, (which is also defensible on scientific principles,) and because those amateurs do not comprehend very lucidly the connection between science and practice, to speak of such experience and scientific knowledge as only *theory*, is ungenerous and unkind: It looks as if when Halley pointed out to the learned world how, by the observation of the transits of Venus and Mercury over the sun's disc, we possessed the means of ascertaining the distance of the sun, some Justice Shallow, in professor's robes, in the profundity of his ignorance, and "armed with a little brief authority," had turned round and told him that the whole matter depended on his being able to prove another theory, namely: "that the three angles of a triangle were equal to two right angles." I protest against the propriety of being called upon to prove anything which is well known and universally admitted, no matter how susceptible of proof it may be, and simply on the ground that it is mere trifling, except such subject has had doubts raised, against it by some one who is equally conspicuous as a man of science and an agriculturist. However, I only enter my protest—I am all submission to the court.

The means which I propose to adopt have nothing new to recommend them, but it can do no harm to repeat the advice which I gave on a former occasion: "Let us suppose that an embankment, where necessary, has been built, of the proper dimensions, of which the farmer himself will be the best judge, with a ditch inside, into which the water which falls in rains, or from springs on the ground, may be drained, and readily pass through and be carried off. If this ditch be not in the requisite situation; it may be necessary to cut one or more pretty large ditches or conductors along the lowest portions of the field, having outlets sufficiently low to carry the water which is thus collected off the ground. This is essentially necessary, for without removing the drainage of the fields, which is not simply water, (we must keep in mind,) but a weak alkaline lye, all our labor would be lost and of no account whatever. Leading into these larger ditches or conductors, which ought to be three or four feet deep, a number of small drains, say twenty-four inches deep, and thirty feet apart, should be cut. This may be done before or after plowing, according to circumstances, or the land may be plowed in regular ridges of that width, and the drains themselves, with but little additional spade labor, made with the plow. The plowing, whether done by a subsoil or trench plow, ought to be deep, as it is by deep plowing, thus opening up the ground and letting the rains of winter percolate freely through the loosened soil into the little drains or enlarged fur-

rows, and through them into the larger conductors, and thence off the field, that the object of washing out the superabundant alkaline matter in the soil can be accomplished." (See Appendix, Note 12.)

Let no one suppose that land so treated, would be in a fit condition for growing crops, as soon as broken up. In England, in the similar operation of reclaiming land from the sea, a series of years is looked upon as sure to elapse before the saline soil can be expected to grow grain or any other cultivated crops. *We must have patience.* We have only been putting nature in the right track. We have only been lending her a helping hand, to enable her to remove the superabundant saline matter which has been accumulating for ages. If it has taken ages to collect, we cannot suppose, notwithstanding we keep all our drains in running order, notwithstanding we continue to keep the soil well loosened, that one winter's rain will do it; nor is it to be expected that two will. Although I think, if they are rainy winters, and the farmer does not neglect his duty, that in many cases the land would be so far modified in its qualities in two years, that, by the application of lime and other auxiliaries, at the proper season, it might grow a productive crop of beets (See Appendix, Note 13,) or potatoes.

I admit that the propriety of applying lime to soils which owe their barrenness to an excess of alkaline matter, consisting chiefly of potash, does not strike us so apparently as in the case of its application to salt marshes. But we must recollect that all these soils are more or less compound in their character; and as lime forms an ingredient of plants, it is not only necessary on that account, but would be useful as an auxiliary, because it has a stronger affinity for many of the saturating acids with which other alkaline bases are connected, than they have, and consequently decompositions must take place, rendering them more soluble in water. The proper time to apply lime is evidently in the fall of the year previous to that in which a crop is intended to be taken; when, to accomplish the object more effectually, it should be carefully and evenly spread on the loose fallow, without emptying it upon the ground, but spreading it at once from the cart. After this, it ought to be plowed in with a light furrow, and the water furrows well cleaned out, so that no stagnant water may lie on any portion of the field, by which the decomposing qualities of the lime would be very much weakened. The invariable experience of farmers proves this to be the most proper time, and the fact is equally in conformity with the presumptions of science and common sense. (See Appendix, Note 14.)

As I have already stated, alkaline soils, tule lands, and salt marshes, being all of a similar character, composed of similar ingredients, and chiefly differing in the respective quantities of saline matters which they contain, instead of now proceeding to point out the comparative qualifications of different crops for alkaline soils, I would defer my remarks on such and similar topics till I have examined into the best methods of bringing the other lands under cultivation, and then treat of the whole collectively, when I have an opportunity of doing it in a more satisfactory manner, without the risk of unnecessary repetition. By doing so, I shall also be enabled, in some measure, to make their

respective peculiarities more evident, and be afforded additional facilities for explaining the reason of any variation in the mode of cropping which it may be advisable to adopt in the case of one soil, which would be unsuitable in others. I shall therefore proceed with what appears to me to be the proper method of reclaiming tule lands.

THE TULE LANDS.

There are, perhaps, no lands in California so deserving of the public attention as the tule lands. Their richness in the mineral constituents of plants, without having them in such excess as to unfit them for immediate cultivation—their abundance in carbonaceous matter—their local situation generally on or near navigable water—the ease with which they can be preserved at all seasons of the year in a tillable condition, while so many are suffering from drouth, and which also adapts them for a regular rotation of cropping, and for plants, the cultivation of which can only be conducted in other places to a limited extent—all stand out so prominently conspicuous, that one would think they ought long ago to have attracted general notice to a greater extent than they have. As if to stimulate us, the domestic histories of other countries tell us of vast domains which at an early day were reclaimed from their swampy river bottoms, which the traveler perceives must have been of a character exactly similar, while the rich verdure which such lands now present, is a convincing proof of their almost exhaustless fertility.

In one respect these lands differ widely from the alkaline soils. The principal object to be effected here, is the erection of suitable embankments; yet, in treating on this topic, only general and not definite instructions can be given. In consequence of the Society's examining committee on essays having last year objected to my essay on the tule lands, on the ground that it did not treat more fully on the engineering department, I have been induced to direct my attention to that subject more earnestly than I would have otherwise done. For this purpose I have been at pains to procure every available information on the way in which the similar object of reclaiming land from the sea has been accomplished in England. I have procured plans and drawings of their works, with the estimated and actual cost, in several instances, with statements of the precautions necessary to be taken, and the precautions which were taken, generally successful, but sometimes otherwise; but they do not bear at all upon the case. We have no breaking waves to guard against, nor sea storms to encounter. But in one respect I am fortunate. I have had a great deal of personal experience about embanking, having for many years been the occupant of a farm located on a mountain stream, which every farmer in the valley, myself included, had carefully banked off, so as to prevent its frequently sudden and unexpected floods from encroaching on our cultivated fields. I believe, too, that my general experience of rural and agricultural matters will enable me to speak with more confidence and correctness than I might otherwise do. If on a former occasion I treated the subject too superficially, I wish to correct my error, and convince every one that now I am anxious to enter fully into the matter.

In discussing the propriety of reclaiming the tule lands, the writer who points out the necessity of erecting embankments can form no more definite conjecture of their expense than the intelligent reader. It would be just as reasonable to ask a railroad engineer what would be the expense of constructing a mile of railroad, without telling him anything about the location, or the facility or difficulty of the undertaking. It is also impossible to say what sort of embankments may be necessary. Let us suppose, however, one of the most expensive which for some time is likely to be built. To use my own words: "Let us suppose an embankment seven feet high, with twenty-one feet of base, and seven feet broad at the top. This would allow both sides to have an angle of forty-five degrees. Inside this embankment, but not too near it, let a ditch about six feet deep be cut, sufficiently wide to furnish the greater portion of the materials of the embankment. A small portion may generally be taken from the outside, without doing any injury. Great care must be taken in having this embankment firmly and compactly built; and perhaps no better system could be adopted than to work in with the mud as excavated from the ditch a quantity of the tules, reeds and rushes, which grow on the swamp, thus forming the embankment into a regular mud wall. To do this more efficiently, abundance of water should be pumped on the dike, if necessary, when building, and oxen used for treading and properly mixing the materials together. (See Appendix, Note 15.)

"The propriety of some such system will be the more apparent when it is considered that the embankment must be water-tight; and every one knows that a small leak during the time the lands are subject to overflow might soon make a large breach, which it might be impossible to stop for several months."

Many may consider that in no instance would such an expensive embankment be necessary; but it bears no comparison to some of the sea walls built in England, *which were not strong enough*. I take this, however, as an extreme case, and only supposed to be wanted then on the side next the lake, bay or river, as it is not likely, where there is so much valuable land of this description, that any which would require higher or stronger embankments will be reclaimed for many years. By having the dike about seven feet broad at the top, it might with caution be used as a road in carting materials for repairs during the wet season, if there were any indication of a breach; and in no case ought an embankment to have the angle of elevation greater than forty-five degrees. From my own experience, if it were not for the immense quantity of material which it takes to build such embankments, I would certainly recommend a longer slope—at all events on the side next the water.

It will be of great consequence to the undertaker of such works to see that they are well and closely covered with turf, which should be thoroughly beaten down; and perhaps, as the tule lands are of an alkaline nature, if there are any dry lands of such a character near, it would be worth his while to drive turf from them with which to cover it. There are several kinds of grasses which throw out tenacious roots, which would be very suitable for the embankment, but as they are

noxious weeds, they would be bad neighbors for the cultivated crops; besides, it is always the proper way to cover embankments with turf, and not have to wait for an artificial grass to form the sod.

In building such embankments, the farmer, or engineer for the time and purpose, should be careful not to build them too near rivers, or in other locations where they are likely to be undermined, except where the land is of great value, in which case he must use additional care in strengthening and securing the foundation, by driving piles into the bank of the river, and using such other precautions as the circumstances render necessary.

For the purpose of convenience, the undertaker of such work may feel disposed to have the canal from which the materials of his dike have been taken, pretty near it, so that he may have less trouble in its erection. It is true such a consideration is of no small consequence; but when such a large-sized embankment as I have mentioned is wanted, he should always have nine or ten feet, at least, between the ditch and the embankment, so that a cart may be taken between them for the purpose of making repairs when wanted.

There is no engineering necessary in erecting such a dike but what any farmer can easily perform. What he has principally to consider, if the embankment is on water at the same level all the way, is to make the top all around equally on a level; and otherwise, to suit the fall in the water, adapting the base and height accordingly. Thus, if any portions of the dike have to be nine feet high, the base has to be twice nine and seven, or twenty-five feet. Again, if in some places it has only to be five feet high, it has to be only twice five and seven, or seventeen feet. He should also keep in mind that an embankment of seven feet in height, although compactly built, may be expected to sink about a foot.

When such a dike has been built along the lowest portion of the land to be reclaimed, the other embankments, as they do not require to be so high, will not require so much of a base; but to make a good, uniform embankment, it should be continued on the same water level as far inland as wanted, on the same principle of having the base twice the height, *plus* seven. (See Appendix, Note 16.) The farmer, or local engineer, should avoid all angles or corners in his work of embanking, and should not be so anxious to have straight lines as gradual sweeps.

In practically carrying out such a system of embanking as I have supposed necessary, the local engineer will find that he has many difficulties to encounter. One of the principal: the weight of an embankment having twenty-one feet of base, seven feet high, and seven feet broad at the top, if built on swampy soil on the edge of a canal large enough to furnish the necessary materials for its construction, would most assuredly press the loose and swampy surface on which it was built, (itself included,) into it. Instead, therefore, of attempting to do the work at one operation, he must proceed gradually. He must begin by cutting a comparatively small ditch at the inner (or farthest from the water) edge of his future canal, and wheel the dirt thence taken to the outer or nearest the water portion of his dike, cutting the ditch only so much, and making the embankment so high (it may be,) as is abso-

lutely necessary to prevent the encroachment of water from without; beginning, of course, at the lower portion of the land to be reclaimed, and doing the work at the proper season. Having proceeded in this way sufficiently far to allow the water to be properly drained off, so as to admit of further progress with a heavier embankment, it would then be advisable for him to lay the base of his dike the whole width, as the materials ought to be well worked together, so as to form one compact mass; but at the same time he must be careful not to proceed too fast, so that time may be afforded for the proper consolidation of the swamp to take place.

To build one lineal foot of such an embankment, ninety-eight solid feet of materials are required. To furnish this material from a canal inside of six feet in depth, its mean width would require to be fully sixteen feet; but every practical agriculturist, as well as engineer, knows that the sides of such cuts should not be perpendicular. They should always be narrower at the bottom than at the top, by which means their sides stand the alternations of weather and other coincidents with greater security. But they should not have too much slope, especially where they are meant to be conductors of water, as thus they become the ready receptacles of seeds of weeds, which spring up and are apt to form obstructions to its course. I would therefore propose, in our hypothetical case, as it has to form the main channel for the whole drainage of the swamp, to allow a difference of one foot (or six inches on each side,) for every foot of depth. This (apparently) would make the dimensions of our main canal, from which the material for our embankment has chiefly to be taken, nineteen feet at the top, thirteen feet at the bottom, and six feet deep, to furnish the approximate quantity of the material required. Where a greater quantity of material is wanted at any particular place, a little foresight should be exercised, so as to provide it from the outside, or from portions of the work where the embankment does not require to be so high, not to mar the appearance and execution of the ditch by having its general width irregular. Where, however, a less embankment becomes sufficient, as in the case of that portion of it which, does not form the water margin, but is simply a continuation inland to prevent overflows from winter rains and floods, the canal inside should gradually decrease in its dimensions toward the size of the other ditches in depth, retaining otherwise its proportions, but diminishing in size as a less quantity of material is wanted.

Such are theoretically the dimensions of a canal sufficient to furnish materials for the embankment. Practically it will not furnish enough. The swampy soil, when dried, will be found to cling into a comparatively small compass, and in many cases will not occupy more than one-half of the space it formerly did. This, however, can scarcely be called a difficulty, as every practical man is aware of the fact, and will know how to make allowances and alterations to suit each particular case.

Before I proceed to investigate further the best method to be pursued, involving as it does the cutting of the minor drains, the laying off of the land in regular fields, and a number of details connected with the subject, a grave question presents itself, which affects, to a great extent,

the entire aspect of our agriculture in general, and more especially of agriculture in California, and particularly in cases like this, where a great object may be attained, but only at an outlay of considerable expense. In England, owing to the comparative scarcity of land, and cheapness of labor, every practical means of enhancing the value of land is sure to be remunerative, when the work is conducted with sufficient skill, and carried on with sufficient capital. In the United States, and more particularly in California, land of the best description is abundant, and the value of labor is high. Money too, with us, though it ought to be very abundant, brings an exorbitant interest; and the whole matter assumes an appearance so different from what it would in Europe, that I confess I feel puzzled whether I ought to recommend a system based upon European husbandry, as there most successfully and profitably carried out, or propose some compromise more especially suited for our own particular circumstances.

I believe I shall best discharge the task which I have undertaken by doing both — by attempting to describe the most effectual means of bringing the lands under consideration into the highest state of cultivation, and also showing how they may be made highly remunerative at a considerable less outlay.

In looking for similar cases, where such lands have been reclaimed in the most successful manner, we naturally turn our attention to England and Holland; not only, as every one knows, because there such improvements have been effected a long time ago, but also because, owing to the high value of land in those countries, the superabundance of labor, and their well established agricultural skill, everything seems to combine to render anything in the shape of an agricultural experiment more likely to be attempted, and if attempted and found advantageous, to be generally adopted.

The Essex marshes, which extend from the outskirts of London a long way down the river, and which are principally used for pasturage, perhaps scarcely form a fair example. They are systematically irrigated by admitting fresh water from the river, every few days, into a net-work of channels, partly natural and partly artificial, which operates so successfully that in all my travels I have never seen anything to compare with them, not even excepting the pastures of Dixmude — the pride of Belgium — so famous for their dairy produce. We must keep in mind that the water with which those marshes are irrigated is muddy with the filth of London. The same objection holds good against the unusual fertility of the Craigintinny meadows, near Edinburgh, which is owing to a similar cause. Still, in ordinary cases, (See Appendix, Note 17,) the philosophy of irrigation seems so transparent, and the unvarying testimony in its favor so satisfactory, that no one could hesitate, especially in a warm climate like ours, to recommend it in all cases where it is practical. It is for this reason that I adduce the case of the Essex marshes, as one, with some modifications, so applicable in many instances, to similarly situated lands in California, where irrigation is so much more wanted than under the cool and moist skies of Britain. (See Appendix, Note 18.)

But it is not for purposes of irrigation that capital is chiefly laid out in England in rendering such lands valuable. The natural rains of heaven, as in our own northern states, are there all that are wanted for keeping the fields green and luxuriant at the warmest season of the year. It is for the purpose of drainage that they have principally to expend money, and for draining lands similar to those now under consideration they have spared no expense. As examples: For the purpose of draining Deeping Fen, near Spalding, measuring about forty square miles, and which would otherwise be a complete swamp, they have erected two steam engines, one of sixty and the other of eighty horse power; and for draining Littleport Fen, near Ely, not much larger, they have also built two engines, one of eighty and another of thirty horse power. By such means the lands are effectually drained by an unfailing power, on which they can place perfect reliance.

Here, to bring such lands into the highest state of cultivation, they would require to be both drained and irrigated. We have not only to embank off the water, but to cut drains, at suitable intervals, to carry off the rain which falls on such lands in winter, and in summer (to render them susceptible of producing to the greatest available extent,) to supply them with water in most instances.

Let us suppose that the land which we are called upon to reclaim is situate on a lake, the waters of which rise, at certain seasons, to a height of several feet above their usual level, partially inundating the country, it may be for miles inland. Having erected such an embankment as I have proposed, along its margin, we have next to subdivide the land into a number of little fields, by drains cut at proper intervals. These fields, for the more easy cultivation of the land, and for other reasons, should form regular squares, or rather parallelograms, having their width in proportion of about eight to ten to the length, by which means they will have more draining and irrigating advantages, without affording any reasonable objection against the facility of culture. In no instance should such fields exceed eight or ten acres, which is a large enough field to secure economical labor. If the object is to bring such lands into the highest state of cultivation, regardless of cost only so far as to have an eye to economical expenditure, they should be about four feet deep, and not less than three feet wide at the bottom, and six feet at the top, by which means, with a little assistance, they will form inclosures for cattle, when wanted. By having the ditches large, a considerable quantity of water may be taken in for the purpose of irrigating and keeping the land moist enough to grow crops at all seasons, and the perfect and easy drainage of such lands in winter effected with greater certainty against casual interruption. The earth which is dug from these ditches should be carted into any hollow places on the adjoining fields, and care taken that the whole surface be perfectly leveled, so that no water may lie on the ground in winter. For the purpose of draining off rain water, in lands that do not admit of natural drainage, and maintaining a constant supply in summer, so that it may stand as a general rule about eighteen inches from the surface, no means can be proposed so effectual as that of steam, which has been so successfully adopted for

the purpose of draining in England and elsewhere. Besides, water, to be more beneficial, should not be allowed to remain too long unchanged; (See Appendix, Note 19;) and consequently appears the value of having a certain means of supply. This is a fact well known, to whatever cause we attribute it. But here occurs the grave question which I have previously stated. Not only are there valid reasons against the general propriety of incurring heavy expenses here which do not prevail in England, but in this case, of having steam power perpetually at work, the objections apply with more than ordinary force. England is a country of coals. Here, fuel of any kind can only be purchased at a high price, and procured for such purposes with considerable difficulty. Steam engines there probably do not cost more than one-fourth of the price which they would do here, while agricultural produce, of every kind, is high and finds a ready market. We are, therefore, naturally led to inquire whether we cannot adopt some other means, which, though not so perfectly complete, may still yield a large profit, and be effected at a comparatively trifling expenditure. This induces other inquiries equally natural: How were such lands managed when brought under cultivation, before steam was thought of for the purpose of drainage? What were the productive powers of such lands under what may have been the less profitable system then adopted? What was the system of agriculture then, which under present circumstances may be or has been dispensed with?

It will be seen that to answer these questions fully would involve a great portion of the history, science and practice of modern agriculture. It cannot, therefore, be expected that on the present occasion I should do other than merely state as much, or rather as little, as may be necessary to establish the point that without the application of steam power the reclamation of the tule lands would be highly remunerative.

Though the proper drainage of land is of the greatest advantage, it is only an acquisition of yesterday, or rather of to-day; for at the present moment one-half of the low lands of England are only in a half drained condition. To give an account, therefore, of how lands in such a state ought to be cultivated, would be merely to repeat what is pretty well known already, namely, how farmers there do cultivate such land. How they sow beans, and wheat, and vetches, on soils which, from their partially drained condition, are unfit for raising turnips. How they are careful not to let lands from this cause rendered stiff, get too dry in spring, before they plow them; and equally cautious not to plow them too soon, lest they get into a cloddy and lumpy condition. How they attain a nicety of observation and practical skill, which purely owe their birth either to their want of that scientific knowledge which would render such accomplishments, by their adopting a more advanced system, unnecessary, or to their being so conservative of established customs as to look sometimes on improvement as an innovation! The mere fact that lands not so perfectly drained as modern science recommends and modern practice is aspiring to attain, have not only been successfully cultivated in former times, but are so at present, ought to satisfy us that in certain cases it is questionable whether capital may

not be more profitably invested than in erecting costly steam engines for agricultural purposes, which also can only be kept working at an extravagant cost. But there is no reason why we should not have wind mills, which, for time out of mind, have been used in a tolerably satisfactory manner, both for the purpose of draining and also for irrigation.

THE SALT MARSHES.

The salt marshes around the margins of our bays and inlets possess a soil analagous to those which we have been considering; in many instances having the same ingredients, with sea salt in addition. Otherwise any allusion to them, except by way of illustration, might be inadmissible. I mean, however, to refer to them as briefly as possible, compatible with the object which I previously stated—to treat on the whole group in one treatise, that we may be the better qualified to judge of any peculiarities to be taken into account in the proper management of one, which do not apply with so much propriety to the others. Besides, the primary steps necessary for the reclamation of salt marshes so nearly resemble those which I have already detailed, that I would only be repeating what I have already said, in attempting to describe them. Like the tule lands, in some instances they will require to be embanked at considerable cost, and in a similar manner. Like the alkaline soils, they have been formed by the accumulation of their principal and distinctive ingredient by means which we must in a similar manner prevent, and in a similar manner endeavor to get quit of. As to their fitness for cultivation, when properly reduced, and the crops for which they are more particularly suitable, I shall have occasion to speak when treating of the cultivation of the whole group collectively. Now, I would merely remark, that although they may take a longer time to be so reduced in their qualities as to be suitable for general cultivation, than alkaline soils, (See Appendix, Note 20,) the local situation of much land of this description on the bay of San Francisco, and the dormant fertility of such soils, which only require to be relieved from their soporific draughts, ought to convince any one that, if they have been found so valuable in other places, they ought not to be neglected here.

PRIMARY CROPS FOR SALINE SOILS.

Of those soils, the alkaline and salt marsh may be considered to form the two extremes—the tule the center, occupying a sort of middle position between them, but milder in its character than either; sometimes impregnated with common salt, and sometimes partaking almost exclusively of the nature of alkaline soil modified by frequent lavations with fresh water. The tule seems to be a good-natured plant. It must have water, and it must have salt of some sort; but whether the metallic base of that salt be sodium or potassium, it would appear not to be very particular. But almost all plants partake more or less of this quality; those which are found on the sea-side, when planted in gardens, in place of soda which they cannot find in the quantities to which they have been

- accustomed, being content with potash. This property, however, even of those plants which seem most indifferent about the matter, so far as experiments have been made, has a limit; and plants which grow naturally on the sea-side do not thrive in soils which are not abundant in soda. The ashes, too, of such plants, show that though the relative quantities of those alkalies are affected by their location and the facility with which they can collect them, in no case can the one be entirely substituted for the other. The tule is evidently a plant of this character, always containing both salts, but varying their proportions according to circumstances. This is the point at which I would arrive—that the tule lands form a connecting link between the salt water marshes and the alkaline soils, and that the fact of the tule being found in some instances in the vicinity of alkaline soils and in others of salt marshes, shows that salt marshes possess alkaline ingredients, and alkaline soils the elements of common salt. Consequently, those soils, as I have suggested, are all *ejusdem generis*, and it is of importance to treat of them in connection. (See Appendix, Note 21.)

But the finding of the tule in different situations not only points out the approximate identity in the ingredients of soils, which some might think were remotely different, but also shows the propriety of the washing-out course which I have recommended so urgently; as the lands on which the tule grows are not so salt nor so alkaline but with proper management they may be brought into immediate cultivation as soon as the water has been drained off; and yet, in many cases this is entirely owing to their intercommunion with fresh, or comparatively fresh water.

In treating, therefore, of those soils, it is evident that when once either of those which stand at the extremes have been so reduced in their qualities as to become capable of growing ordinary crops, they will very closely resemble the tule lands as they now are, or rather as they would be when properly drained, the crops which are suitable for the one soil being generally adapted for the other. (See Appendix, Note 22.) Such being the case, I propose to examine more particularly the best and most profitable method of managing tule lands as a general type of the group, but pointing out in what respects it may be necessary to have recourse to special modifications in regard to the others, where the distinctive peculiarities of either, and other circumstances, may render any deviation from more common practice necessary.

In looking back to where I left off adverting more particularly to the tule lands, it will be seen that I supposed it necessary, in order to bring such lands into a proper state of cultivation, not only to have substantial embankments built, with a large ditch inside for the purpose of having the lands drained, but to do so effectually and also to facilitate irrigation, that it would likewise be necessary to have the whole subdivided into a number of little fields, not exceeding eight or ten acres each, by suitable ditches. Having thus embanked and subdivided the land to be brought under cultivation, let us proceed with that object in a husbandman-like manner. For this purpose I would repeat the advice which I have formerly given.

"Our swamp lands, properly drained, and the ground sufficiently dry to admit of being plowed, let the tules and other aquatic plants (as reeds and rushes) which grow on it, which can be burnt, be so; so as to form no impediment to the plow. After which, let the land be well turned up with a common trench plow. When plowed over, the future management will very much depend on circumstances. Where there are a great number of roots, and the furrows lie open, and the surface is much exposed, it would frequently be better not to attempt cropping for the first year; especially as in such cases we would have an opportunity, during our dry summer weather, of burning up the rough surface and roots, and thus at once removing every incumbrance. But (See Appendix, Note 23,) where no such impediments prevail, the ground may be sown with oats for hay; or any other crop which the experienced farmer thinks most suitable, taking all the circumstances of the case into account.

"However proper or necessary light harrows may be in general cultivation, for the purpose of making a fine tilth, for such lands, when newly broken up, they are unsuitable. Here, we would require a strong and heavy harrow, and none is equal for that purpose to the triangular, with coulter-shaped teeth, strongly fastened with screws and bolts, and having plates of iron underneath the bars; with handles attached to it, so as to admit of its being lifted up for the purpose of removing roots and weeds. (See Appendix, Note 24.)

"When the ground is left fallow for the first year, an opportunity is afforded of having it well broken up in the course of the summer; and it would in consequence be in an excellent condition for being planted next year with potatoes, a crop for which it would generally be found particularly adapted"—the only cases where they would be found unsuitable being where it was only half drained.

If we could prevail on ourselves to exercise enough of patience, the other soils after a time would be reduced in their qualities by the means which I have proposed, so as to be as suitable as tule lands, when properly broken, for the cultivation of any crop generally grown. But we have no disposition to delay their cultivation any longer than we can possibly help, and consequently have to ascertain what crops are more especially suited for such soils, while they are yet so saline in their qualities as to be unfit for promiscuous cropping. By turning to notes seven and nine, in the appendix, it will be seen that there are no crops generally cultivated in California, so suitable for lands having an excess of saline ingredients, as bulbous, tuberous, and leguminous plants, such as potatoes, turnips, carrots, beets, parsnips, beans, peas, vetches, and clovers; and that of these plants, the first and last stand prominently conspicuous. Now, as our saline lands, it is to be presumed, have, for the purpose of accelerating their cultivation, been subjected to a continued stirring and fallowing, it may have been for years, the proper crops to succeed such a course of husbandry are green or root crops. The potato, therefore, puts in its claim, as being entitled, under the circumstances, to take precedence of any other crop; especially as the clovers, being biennial plants, cannot be economically used under any circumstances.

Having succeeded in raising one good crop, the object of reclaiming such lands has been effected; and no one deserves to be called a farmer who does not take care to plant only such crops as are rich in alkaline matter for some time afterward, so as to put all risk of failure out of the question. As a general rule he should vary his crops, which, in such soils, from their general situation, he has an excellent opportunity of doing, making the grain crops follow root crops, and the clovers and grasses follow grain. This is a fact confirmed by experience, to an extent which philosophy fails to account for. It has been argued with apparently convincing proof, that the components of one class of vegetables being different from those of others, which require the ingredients for which the former are conspicuous only in minimum quantity, the fact of their suitableness to follow each other is fully established. It has been presumed that plants leave in the soil certain excrementitious matters which are poisonous to similar plants, but may be the food of others. Both suppositions are probably correct, and in many cases the first must be so. But even in such cases as this, of saline soils, where no such inconvenience could result from such a cause, the change from one species to another is always attended with advantageous results, and a different practice found incompatible with good husbandry. Nature has secrets which have not yet been fully disclosed. She delights in variety and change. If we do not exactly know all her reasons for doing so, let us not, on that account, refuse to gratify her cravings.

Among the grain crops, as will be seen by an inspection of the tables already referred to, none are so suitable as beans and peas. I would therefore advise the farmer, after raising a crop of potatoes, to make his next crop one of beans, which always find a ready market and bring a high price; for beans and peas are grain crops, *sui generis*, being leguminous, and on that account resemble, in the way in which they affect the soil, the clovers more than they do wheat and barley. His next crop may be potatoes again, or some of the other root crops which he may have reason to think would, in his case, be more profitable. After the land has grown a second crop of potatoes, or other green crop, such as beets, turnips, onions or carrots, he need not be afraid to sow barley, with timothy (or rye grass) and clover for a hay crop the following year, along with it. Thus, on such lands, though the farmer may have been at considerable expense, and have had, in many cases, to exercise much patience, he will at last have succeeded in having a soil in which, with ordinary facilities of irrigation, he may be able to raise, without trouble, a regular succession of crops.

It is to be presumed that the whole of the two former crops will be removed, and a considerable portion of the latter two off the farm, by which means a considerable portion of alkaline matter will be removed along with them. But the farmer has now got nature to work for him, and not against him as formerly, and he must use caution not to carry on this removing process too long. The plants which grow on his fields are not composed of saline matters only, their components are principally carbonaceous, and they grow more luxuriantly in soils of a carbonaceous character. It is of much importance to him, therefore, not to de-

prive his soil of anything so necessary for preserving its fertility. But of this the farmer scarcely requires to be put in mind.

When the clover lye is broken up, no better or more profitable crop than wheat can be proposed, the young stalks of which contain a large quantity of alkaline matter; and besides, in all countries where it is suitable, it ought to be the farmer's staple crop.

FRUITS AND FLOWERS.

If the cultivator of saline soils wish to have fruit trees he will have still more need of patience, that virtue with which, of all others, he would require to be fully gifted. After the stirring and plowing of the surface, and the rains of heaven have rendered the soil, for some depth, available for the growth of plants which require a more than usual quantity of alkaline salts, the soil still retains, below where the plow has gone, its approximate original saltiness for years; and plants have no power of keeping out of the way of poisons, but innocently grow on till they come into actual contact with them, and are killed. (See Appendix, Note 25.) And although, as has been proved by repeated experiments, they have the power of rejecting what is hurtful, and selecting what is useful, the mere fact of alkaline and similar soils being, in their natural state, incapable of growing ordinary crops, is enough to show that they only possess this power to a limited extent. But there is another fact connected with the philosophy of plants, which I have frequently observed, which gives us more hope; namely: that where they are liberally supplied with moisture an excess of alkaline matter has less power to hurt them—as in shallow soils which have received an overdose of lime. Though in dry weather the leaves drop, and if it continues dry the ears of grain in such situations do not fill, yet in rainy seasons no such effects are visible; and even after they have presented such an appearance, when rains have fallen seasonably, I have observed, on such occasions, that in most instances they have recovered their former healthy aspect, and that the ears of such plants ripened as those which had not been so affected. If, therefore, fruit trees are planted in saline soils, after they have been so reduced in their natural qualities as to be capable of growing ordinary crops in situations where they can be liberally supplied with fresh water, we are justified in concluding that they would not only grow, but grow vigorously. The analyses of fruit trees show that they contain a large proportion of alkaline salts, (See Appendix, Note 26,) and gardeners generally find no manure better suited for them than wood ashes, which not only corroborates the fact, but indicates also that soils which naturally abound in the ingredients of such ashes are suited for their growth.

Berry bushes seem particularly suited for saline soils. All shrubs, according to Thomson, (whose laborious devotion to chemistry must endear his name to every scientific man,) contain three times the amount of ashes which trees do. This may be accounted for on strictly mathematical principles. The alkaline sap which circulates in the plant passes chiefly near the bark, in what, in trees, has received the distinc-

tive name of sap-wood, before it undergoes any transformation of its nature from its intercourse with the carbon of the atmosphere, in the leaves, and as a natural consequence the bark and sap-wood are invariably richer in alkaline matters than the inner portion of the plant, which is more carbonaceous. Consequently, as the contents of a circle are proportional to the square of the diameter, the smaller the twig the greater the quantity of alkalies in it, and in that geometrical ratio. There is also another reason, which, from the simplicity of the laws of nature, would convince us that berry bushes and fruit trees, and all plants of which the matter of the edible portion undergoes much transformation during their growth, must necessarily contain an abundance of alkaline matter. Of this portion the progressive composition, in all cases, is approximate, consisting principally of carbon, oxygen, and hydrogen, in the form of starch, gum and sugar, which indicate a proportion so nearly identical that it requires much analytical skill to be able to detect any difference in their components. They are convertible in regular succession. Thus starch can be converted into gum, and gum into sugar; and the means which the learned chemist adopts for such purposes are, to apply diluted acids, as nature does. But acids owe their acidity to the quantity of oxygen which they contain; and the means which nature adopts in procuring acids for her natural laboratory are, to use alkaline oxyds having already a considerable quantity of oxygen in their composition, and which are also capable, in consequence of their being metallic in their origin, of combining with still greater quantities and in other proportions from the atmosphere, in the cells of the leaves, where new combinations and connections take place; thus the sap is necessarily alkaline, and the fact of any transformation having taken place by means of an acid, also goes to show that such acid was furnished from sap possessed of alkaline qualities.

"Judging from analogy," (See Appendix, Note 27,) as I on a former occasion remarked, "the flowers best adapted for alkaline soils (and consequently for saline soils generally,) are those with bulbous roots. Nature does nothing but in a plain and intelligible manner. The large bulbs and tubers which some plants have connected with their roots, are evidently meant to contain sap. But we know that this sap is not water, but a weak alkaline solution; which seems necessary for assimilating carbon for them from the atmosphere. We also know, from the experiments of Saussure, that the power of elaborating this sap from the soil rests in the smaller roots. (See Appendix, Note 28.) We are therefore authorized in concluding that nature had other motives for being so provident of alkaline sap in the root for the use of such plants, and that the reason was that a larger quantity than usual was necessary for their perfect growth.

"So far as analyses of such and the similarly circumstanced plants, with large fusiform roots, have been made, experiments are confirmatory of this conclusion. Take, for instance, common garlic, (*allium sativum*,) a member of the onion family, all of which participate to a certain extent of its principal properties. In one hundred and seventy-two parts of the ashes of this plant, Cadet found thirty-three parts of potash,

and fifty-eight parts of sulphate and muriate of potash. Turnips, beets, carrots, and potatoes, as we have seen, also contain much alkaline matter, and afford further corroborative testimony of the shape of plants being frequently indicative of their character."

Similar arguments hold good in regard to leguminous flowers. So far as analyses of plants of this order, such as beans, peas, and vetches, have been made, they have been found to contain a greater quantity of alkaline matter than ordinary grain plants. Flowering shrubs also, for the reasons already mentioned, must, like other shrubs, contain a large quantity of alkaline matter, and on that account be well adapted for such soils. (See Appendix, Note 29.)

THE ADAPTATION OF OUR SALINE SOILS FOR CERTAIN USEFUL PLANTS NOT GENERALLY CULTIVATED.

Thus far I have endeavored to show the adaptation of saline soils for such plants as are usually cultivated among us, as specially suggested by the Society. There still remains their "*et cetera*," with regard to which I am left to exercise discretionary privileges. As the attention of the public has been directed to several others not generally grown, (which may be included under that general designation,) the cultivation of which it is presumed might be attended with highly profitable results, in examining fully the nature and capabilities of such soils, I consider I am only discharging my duty to the Society and the public, in inquiring into how far some of those plants may not be particularly suitable on such lands, partly on account of their situation, and partly on account of their component ingredients.

There are a great number of plants, no doubt, which might be cultivated on such lands with some profit, one-half of which it would be tedious to enumerate; but many of them are objectionable, on the ground that they would not yield so much comparative profit as those in more common use. Of those which have been spoken of as suitable for our state, and which bid fair, under proper cultivation, to be really advantageous, and which would be admirably adapted for such soils, rice, maize, hops, hemp, flax, and tobacco, deserve especial notice.

That rice, which grows so thrivingly and in such perfection in South Carolina and the adjoining states, would grow equally well in our warm valleys, does not admit of doubt. It is an article for which we have a constant demand, and it brings a high price in the market. We have among us a great number of Chinamen, many of whom must be well acquainted with its cultivation, and their labor might be procured at a moderate rate. It is, with them, a staple article of food, and were there no others in this state who used it, we need not be afraid of a decrease in its consumption. Then the tule and other similarly situated lands, where we could readily get a plentiful supply of water, when wanted, have naturally a preferable claim as the very lands on which we should attempt its cultivation. Besides, rice, like all other aquatic and amphibious plants, requires a soil which is rich in alkaline matter. To use the words of Liebig, "The potash abstracted by plants is restored by

irrigation. In the vicinity of Liegen, a town of Nassau, from three to five crops are obtained from one meadow, and this effected by covering the fields with river water, which is conducted over the land by numerous canals. This is found to be of such advantage that, supposing a meadow, not so treated, to yield one thousand pounds of hay, then from one thus watered four thousand five hundred pounds are produced. When we increase the crop of grass in a meadow by means of gypsum, we remove a greater quantity of potash than can, under the circumstances, be restored. But if the meadow be strewed, from time to time, with wood ashes, then the grass thrives as luxuriantly as before"—thus not only showing that water-loving plants grow better when they have a large supply of potash, but that when their extra growth has been effected by stimulants, whereby that salt, so essentially necessary for their growth, has been carried off in excess, the fertility of the soil may be at once restored by its restitution. If our soils, therefore, contain a large proportion of potash, they must, within certain limits, be so much the better suited for such plants.

For such soils, (where the situation is not too much exposed to wind,) maize or corn, so well known to every cultivator of the soil from the older states, is also particularly well adapted. In one hundred parts of the ashes of this plant, Saussure found sixty-nine parts of potash, while even in the plants of peas and vetches, to which it might have been presumed, as they are leguminous, to be inferior in that respect, the quantity, though great, was, in the one case, 49.8, and in the other 55.5—enough to convince any one of the adaptation of such soils for the growth of maize.

The hop is a plant which ought to be cultivated in California; and, if properly drained, such lands are particularly suited for its growth. It loves a rich and loamy soil; and the fact that, in England, from ten to fifteen bushels of common salt (in addition to other manures abounding in alkalies,) are found a highly useful application, is proof positive that it is well adapted for soils which are naturally saline. Besides, we have, along the edges of the necessary drains and ditches of our tule lands, an excellent opportunity of planting poplars, which, when young, are admirably suited for hop poles. Of the different varieties, one of the best, for the desired purpose, is the Athenian poplar; (*populus Græca*.) It grows rapidly, young trees often making a start of five or six feet in one season; and though a slender stemmed tree, has the valuable property of resisting the wind, and is never found, even in the most exposed situations, but erect and perpendicular. The fact that the poplar does not contain but a moderate quantity of potash in its wood, would appear to show that it is unsuited for such soils. But the analysis of Saussure (See Appendix, Note 80,) exhibits it as having in the bark and leaves a more than usual quantity. Consequently it uses a more than usual quantity while in the act of growing. Its sap must be largely alkaline, and though it does not deposit so much potash in its wood as some trees do, it substitutes in part carbonate of lime, of which it appropriates a large proportion. Planted on the edges of ditches containing fresh water, we need entertain no fears of its perfect adaptation for such soils.

What a domestic character would regular rows of such trees, planted round every field, confer on our newly reclaimed land! How much of the apparent superiority of comfort in the rural life of England over that of Scotland is owing to her enviable hedges and hedge-rows!

Hemp is another plant which we want in California; and of all others the soils now under consideration are the most suitable for its growth. It is a member of the nettle family, which at once stamps its character as an alkaline plant; as may be seen by reference to the table in Note 4. The hemp delights in rich meadow and alluvial soils, and its cultivation in England is now principally confined to Lincolnshire, Norfolk, and Suffolk, where soils which originally have resembled our tule and saline marshes, abound, and on which it is chiefly cultivated. It has been said that for every foot in height which the plant attains, an acre of land will produce one hundred weight (112 lbs.) of dressed hemp. Thus, if the plants average eight feet in height, an acre will yield eight hundred weight; if ten feet, ten hundred weight, etc. Judging from the comparative size of some other vegetables more usually grown here and in England, I think we could manage to beat our trans-Atlantic cousins in the matter of hemp also.

Flax, like hemp, thrives most luxuriantly on rich, alluvial soils. It has been much spoken of as a suitable plant for this state, and so soon as our saline soils are sufficiently reduced to grow wheat, they would be well suited for its growth—the tule lands immediately on reclamation, if they be not too fertile. I have cultivated flax myself, and I know it to be a particular plant. It is not the most luxuriant growth nor the greatest quantity of flax on an acre which makes a flax crop valuable, but its quality; and in very few articles does the scale of value take so wide a range. When I was living in Belgium, I was requested by a London merchant to pay a visit on his account to Lakeren, a village or town with some two thousand inhabitants, about half way between Ghent and Antwerp, in the neighborhood of which the best flax grown in any portion of Europe is raised, and I succeeded in procuring samples of flax such as I had never before seen. "The soil in that portion of Flanders is not so sandy as nearer Ghent, nor so tenacious as on the lands of Antwerp, but of that happy medium which it seems is particularly suited for flax. I believe, as some of the tule lands resemble it very much, (if they be not too rich,) that they would grow very fine flax, if a proper mode of cultivation were adopted, but as the value of the crop depends so much on the precise nature and composition of the soil, I would not hazard giving a confident opinion on the subject. That they would grow the flax plant and grow it abundantly is certain, and on that account it would no doubt form a valuable crop on such lands, were it only for its seed."

Tobacco. "The first colonists of Virginia," writes Liebig, "found a country the soil of which was rich; harvests of wheat and tobacco were obtained for a century without the aid of manure; but now whole districts are converted into unfruitful pasture land, which, without manure, produces neither wheat nor tobacco. From every acre of this land there were removed, in the space of one hundred years, twelve hundred pounds of alkalies; it became unfruitful, therefore, because it was de-

prived of every particle of alkali which had been reduced to a soluble state, and because that which was rendered soluble again in the space of one year, was not sufficient to satisfy the demands of the plants." Other chemists would make the quantity which must have been so removed much greater. (Probably he meant of potash.) Mr. Owen Mason, of Providence, R. I., has computed the saline contents of the crops raised from a field near that place, during eight years cultivation, (weight fourteen tons,) as follows:

	Pounds.
Potash.....	421.92
Soda.....	131.92
Lime.....	532.88
Magnesia.....	64.08
Alumina.....	5.96
Silica.....	390.40
Sulphuric acid.....	113.88
Phosphoric acid.....	108.12
Chlorine.....	58.64
Total.....	1,830.80

A similar calculation is made by Professor Johnston, of the amount of mineral ingredients per acre in the crops grown, during four years, according to the four-course rotation, as followed near Edinburgh:

	Pounds.
Potash.....	280
Soda.....	150
Lime.....	242
Magnesia.....	50
Silica.....	318
Sulphuric acid.....	111
Phosphoric acid.....	96
Chlorine.....	30
Total.....	1,271

"It is doubtful," remarks Mr. Mason in regard to his calculation, "if the cultivator ever suspected that he carried to his barn, two casks of potash, one cask of soda, two casks of lime, a carboy of oil of vitriol, a large demijohn of phosphoric acid, and a variety of other matters, which were as certainly stowed away in his mows, as if they had been conveyed thither in casks and carboys."

The inference which I would draw from the above is, that those Virginia soils must have been originally unusually rich in alkaline matter. That they are famous for the quality and quantity of tobacco which they have produced, is equally notorious. From these facts we cannot help coming to the conclusion that tobacco would be well suited for such soils as we are now considering, if properly modified in their qualities and suitable in other respects.

According to Mr. J. F. Edmunds, of Mecklenburg, Va., who has

furnished us with very concise and comprehensible directions for the cultivation and management of tobacco, "In Virginia and other states, the best tobacco is grown on rich, alluvial, loamy land, or such as has been recently cleared and brought under cultivation. Tobacco requires a mild and warm season, and can never be worth growing in situations elevated much above the level of the sea, in northern exposures, or in wet and springy land." When we take, therefore, into account the composition of tobacco and that of our tule lands, and their local situation, we are justified in concluding that all that would be wanted, to render them in every respect especially suitable for its cultivation, would be to give them a good manuring with lime. (See Appendix, Note 31.)

THE ADAPTATION OF SALINE SOILS FOR ORDINARY KITCHEN VEGETABLES.

As well as being desirous to ascertain how far saline soils are suitable for fruits and flowers, the farmer feels a natural anxiety to know their adaptation for ordinary kitchen vegetables. On this point he has no occasion to be uneasy. As we have already seen, potatoes, onions, beets, carrots, parsnips, and by a parity of reasoning, if not by analysis, all bulbous and tuberous rooted plants, are especially suitable. Also, the whole cabbage family, including cauliflowers, broccoli, Brussels sprouts, kales and kaleworts; for they trace their parentage to plants from which they now differ considerably, but which are only to be found on the sea coast. They are naturally saline plants. Such is the case more particularly with the sea kale, whose name is enough to indicate its origin. The artichoke is nothing but a big thistle; and the thistle, as will be seen by a reference to the table in Note 4, contains a large proportion of alkali. The asparagus was originally a salt marsh plant, and gardeners are aware of the importance of occasionally supplying it with common salt, to gratify its only partially subdued predilections. Celery, in its natural state, grows in ditches, and as we have learned from the reasonings of Liebig, such water-loving plants necessarily require alkalies in abundance. Its congener, parsley, is evidently a plant of similar components. Beans and peas I have already had occasion to introduce, as especially suitable.

With these to commence with, the farmer who settles on such lands need not be afraid of suffering from scorbutic complaints, brought on by a deficiency of vegetable diet. Besides, we may naturally conclude, since the stem of the potato plant (Note 7,) has been found to contain such an unusual quantity of potash, that the tomato, which in appearance so much resembles it, is like it in that respect also. The same reasonings, too, which apply to bulbous rooted plants, would seem to be applicable to those the size of whose fruit bears an extravagant proportion to the rest of the plant, as in the case of the pumpkin. Once admit the pumpkin, and the melon, watermelon, squashes, cucumbers, etc., follow in its train. But admitting that in regard to this class, and also regarding the tomato, I have not established such a perfect right of property as would justify the court in passing judgment in their

favor, I think I have succeeded in showing that saline soils, generally speaking, are admirably adapted for the growth of kitchen vegetables.

THE MODIFICATIONS OF CULTURE PROPER UNDER
DIFFERENT CIRCUMSTANCES, ON SALINE SOILS.

It will at once appear that the subjects embraced in this topic are too vast for me to treat, except in a very superficial manner. They involve more of practical than of scientific agriculture; and as in practical agriculture a slight shade of difference frequently requires an entirely different practice, farming, like any other art, to be properly learned, requires a regular apprenticeship of observation, by which the young cultivator may be able to detect at once those shades of difference, and become accustomed to judge from facts, as they come within his own observation, the reasons which make special deviations necessary. But there are certain divisions in which the soils now under consideration may be classed, according to their degrees of improvement.

First.—If the tule lands were completely drained and irrigated, the richness of their soil, and its particular adaptation not only for the crops usually grown, but also for others, the cultivation of which, in many cases, would be still more remunerative—the enviable climate of California, the full advantages of which, from their situation and accessories of irrigation, they afford so many facilities of appropriating, at seasons when lands less favorably located are in a half petrified condition, and also their general situation on navigable water—all point them out as so pre-eminently valuable, that in cases where expensive improvements have been made, the most prudent advice seems to be to follow out the idea, already so far advanced, of doing everything in the most perfect manner, and farming the land, which has inevitably cost a considerable amount, on the most approved principles and with the most perfect implements.

Second.—When, from a consideration of the expense, the difficulty of its accomplishment, or other reasons, the object of draining and irrigating such lands is less completely effected—to be profitable, variations of cultivation as multifarious as the circumstances which call for them, have to be adopted. In some cases, the lands, from being imperfectly drained, will have to be minutely watched when the warmer suns of spring and the retiring waters render them in a fit condition for being cultivated, so that plowing be not attempted too soon, nor too long delayed; as in either case, it would be impossible to bring the ground into that proper state of tilth which is of so much advantage in fostering the growth of the young plant—in others, where from their situation fewer obstacles occur to prevent perfect drainage, but irrigation is only partially employed or available, it may be prudent to have the ditches between the fields of a considerably less size, to prevent the heat of summer from depriving them so much of their moisture. In many instances, where either of these circumstances prevail, a different course of crops may have to be resorted to; under one, from the wet state of the land in winter rendering it unfit for the prudent cultivation of some

of those which would otherwise be advantageous; under others, from the summer drouth so affecting the soil as to produce a similar objection. In both cases the relative value of such lands would be materially affected. Instead of being able to continue with enviable ease, and more enviable certainty of success, a repetition of crops in one year, owing to the rare advantages of climate in this state, in many cases we may be obliged to be content with the more common blessing of having one good crop—the principal difference between the farmer of such lands and others (and which, if prudent, he may turn to good account,) being, that generally such crop will not be grown at the same season of the year as those of his neighbors.

Third.—With regard to the other soils. When properly reduced in their qualities, they will so closely resemble the tule lands, that where the facilities of obtaining the highest state of cultivation are deficient, the same degree of caution, compliance with circumstances, and adaptation of crops as are necessary in such cases, will have to be adopted in theirs also; and the same ratio of the productive powers of these soils will be the result of such precautions and modifications.

MEANS OF IRRIGATION AND DRAINAGE.

Although, as in the cases of Deeping and Littleport Fens, in England, and that of Haarlem Lake, in Holland, already referred to, and in many others, steam has been most successfully used for the purpose of drainage, and may with equal propriety be made equally valuable for the kindred purpose of irrigation, there are vast tracts of valuable land, especially in the latter country, the drainage of which is effected by means of wind mills. It is true that where so much depends on the constancy of the power employed, steam has in that respect much in its favor, yet when we take into account, as I have already suggested, the formidable objection of expense, especially in California, it seems necessary to pay a little more attention to the subject of wind mills, than might, under other circumstances, have been of such practical importance.

We are told in the article on the draining of Haarlem Lake, in the patent-office report, which I have already quoted, "that the recovery of land from the water in Holland is there the most important branch of engineering, inasmuch that a government board has existed for centuries, the duties of which are confined to the administration of the hydraulic works of the kingdom—that the Netherlands now present to our view an artificially constructed country, some portions of which are many feet below the surface of the sea, and nearly all too low for natural drainage—and that for the purpose of securing the permanence of their territorial possessions, the early occupants of that country had recourse to dikes or embankments, high and strong enough to protect them under ordinary circumstances from the tides, and placing wind mills on those dikes exposed to the sea breeze that worked the pumps which drained the inclosed lands." Now, if for centuries wind has been used so successfully in a country of which it has become proverbial that "the

Dutch built Holland," and the construction of that country is mainly traceable to its application, we may be excused for having recourse to its agency in California, although at first it presents the appearance of a retrograde movement in the present advanced state of modern agriculture. It is true, steam is a more reliable power, but there are many instances in which wind has been completely successful in Holland. In England, also, steam is only beginning to be introduced for such purposes, and in cases where cheaper means cannot be used to advantage. In many cases we could doubtless employ wind power with perfect success, both for drainage and also for irrigation; and where it would not be so successful we might do so for a time, modifying our agriculture accordingly, till altered circumstances made the more efficient power of steam advisable.

There may be many instances in which, by taking advantage of other circumstances, we might be enabled to dispense with the use of either power. To quote my own words: "In reclaiming a large extent of country, we would frequently have an opportunity of diverting a mountain stream from its course, or water from a river, so as to provide a sufficient supply for the purpose for which we want it. In others, where the land reclaimed was bounded and rendered naturally unproductive by a river in which the tides rose and fell, we might construct proper floodgates, by means of which the objects of drainage and irrigation might be effected." There are also, no doubt, some instances (more particularly when the land to be reclaimed is of minor extent,) where abundance of water for irrigation might reasonably be expected from artesian wells.

CONCLUSION.

It is now some twenty years since Liebig presented the manuscript of his great work on organic chemistry, as a contribution to the British Association, at Glasgow; in which he showed, that on the principles of Sir Humphrey Davy, since Davy's time, the world has made advances in science of which agriculture would do well to take advantage. He also convinced the world that in the present day science was the only sure stay on which agriculture can place reliance; and that all that experience can teach, except science take up the tale, is crude and indigested and not applicable for general use, till the true relationships of supposed causes and effects are placed beyond a doubt; from which we gather, that experiments in the hands of those who are deficient either in scientific or practical knowledge are only calculated to mislead. The world since then has had time to digest his philosophy; and every year has but added to his laurels. His case gives hope not only to agriculture, but to mankind. But if it discloses blessings in store, it also points to duties to be performed. We discover the great good which learned associations may do, by bringing into view not only the claims of unnoticed merit, but into earlier or greater notice the claims of those whose merit has already begun to be acknowledged; and are shown that through such public channels the philosopher (See Appendix, Note 82,)

has opportunities of benefiting others, of which it is his duty to avail himself.

In the foregoing pages, and in the appendix, it has been my endeavor to adhere to a strict course of investigation and testimony, and detail of established practice; which, without such a brilliant example, or such conspicuous proof that this is the only kind of argument which the present age in its enlightenment will or ought to admit, are, no doubt, the most satisfactory ways in which such questions can be treated. The world is sick of hearing repeated that such was the opinion of a certain great man, and such the opinion of another. It wants demonstration, deduced by legitimate reasoning from facts, whether well known or now first promulgated; but it must have facts for the basis, either already recognized, or gathered from the investigations of men of such character for accuracy as puts their testimony beyond a doubt, or from the personal experience and observations of the writer.

APPENDIX.

NOTE 1.—*Former Level of the San Joaquin.*—The valley of the San Joaquin has undergone a striking change. The traveler, as he comes from Stockton, more than thirty miles from Fort Miller finds himself on an extensive plain covered with water-worn pebbles, which are quite common the rest of the way. At Fort Miller, where the river leaves the mountains, the line of these pebbles is very distinct. To a casual observer there are evident marks of two separate changes in its level, one considerably above the other; the opposite sides of the river having at the same level two distinct shelves, resembling in some measure the famous parallel roads of Glen Roy. The upper shelf is probably not less than a hundred feet above the present level of the river.

NOTE 2.—*Peat Mosses of Scotland.*—In Scotland, on many of the higher hills, peat is found to a large extent, possessed of a spongy, swampy character, in some respects analogous to our swamps and marshes; but where, from its elevated situation, the land would be comparatively dry if the peat were removed. It is evidently thus produced:—where such peat mosses (as they are called,) are met with, the hill tops are flattish, and consequently, in many places, owing to the inequalities in the surface, water must have formerly stood in the hollow places. In those hollows aquatic and marsh plants sprung up, which the cold and rare atmosphere of those northern regions on their death only partially reduced to decay, a circumstance further occasioned by many of those plants containing a large quantity of tannin. But the swamps thus commenced continued to spread, drawing moisture strongly possessed of antiseptic qualities after them, and now in many places cover whole hill tops, drinking up the rains of winter, which during summer they retain.

NOTE 3.—*Chemical Composition of Rocks.*—Next to chemistry, geology is capable of affording a rich harvest of information to the farmer. While others make use of it in indulging in idle disputes con-

cerning the age and formation of the earth, let the agriculturist study the practical uses to which the positive information which it gives may be turned. If rocks differ in their constituents, he will thus have the key whereby he may discover the cause of barrenness in certain soils; and be enabled, by the addition of those components of plants and fertile soils of which they are deficient, to render them productive. In reference to the ingredients of such rocks as more immediately concern us on the present occasion, common mica, according to the analysis of Klaproth, is composed of :

	Parts.
Silica.....	47
Alumina.....	20
Oxyd of iron.....	15.5
Oxyd of manganese.....	1.75
Potash.....	14.5
Lime.....	1.25

100.00

Common feldspar, according to Vanquelin, is composed of:

	Parts.
Silica.....	68.83
Alumina.....	17.02
Lime.....	3
Oxyd of iron.....	1
Potash.....	18
Loss.....	3.15

100.00

Braude found in a specimen of pale-colored feldspar, from the Alps:

	Parts.
Silica.....	68
Alumina.....	20
Potash.....	8.30
Lime.....	2
Oxyd of iron.....	0.50
Loss.....	1.20

100.00

Quartz, according to the analysis of Bucholz, is composed of:

	Parts.
Silica.....	96.75
Alumina.....	0.50
Water.....	1
Loss.....	1.75

100.00

NOTE 4.—*Alkaline Matter in Plants, etc.*—Although the difference in the trees which are found at different altitudes depends on

other causes than merely the composition of the soils on which they grow, yet do we find in this an instance of economy in the laws of nature. If the fir tree requires a colder atmosphere than the oak, which it finds on the mountain tops, it does not require the same amount of alkaline salts which the oak does. The oak, therefore, is adapted by nature for growing in lower and warmer situations, where, without any extra exertion on her part, those alkalies are to be found in greater abundance.

— "Trees," says Liebig, (and the fact appears self-evident,) "the leaves of which are renewed annually, require for their leaves six or seven times more alkalies than the fir tree or pine; and hence, when they are placed in soils in which alkalies are contained in small quantities, do not attain maturity. One thousand parts of the dry leaves of the oak yielded Saussure fifty-five parts of ashes; of which twenty-four parts consisted of alkalies soluble in water; the same quantity of pine leaves gave only twenty-nine parts of ashes, which contained 4.6 of soluble salts. When we see such trees as the red beech, the service tree, and the wild cherry, thriving luxuriantly on limestone, we may be assured that alkalies are present in the soil, for they are necessary to their existence. Can we then regard it as remarkable that such trees should thrive in America, on those spots on which forests of pine which have grown and collected alkalies for centuries, have been burnt, and to which alkalies are thus at once restored; or that the *spartium scoparium*, *erysinum latifolium*, *blitum capitatum*, *senecio vicosus*, plants remarkable for the quantity of alkalies in their ashes, should grow with the greatest luxuriance on the localities of conflagrations? According to the authority of Franklin, after the great fire in London, large quantities of the *erysinum latifolium* were growing on the spots where a fire had taken place. On a similar occasion, the *blitum capitatum* was seen at Copenhagen, the *senecio vicosus* in Nassau, and the *spartium scoparium* in Languedoc. After the burnings of pines in South America, poplars grow on the same soil." Here, for a similar reason, we only find tules on soils which contain a large proportion of saline matter.

The following table, from the "United States Dispensatory," gives the quantity of potassa contained in the ashes of one thousand parts of different plants:

Pine.....	0.45	Barley straw.....	5.8
Poplar.....	0.75	Beech bark.....	6.0
Birch.....	1.29	Fern.....	6.2
Beech.....	1.45	Stalks of maize.....	17.5
Oak.....	2.03	Stalks of sunflower.....	19.4
Oak bark.....	2.08	Dry oak leaves.....	24.0
Box.....	2.26	Common nettle.....	25.0
Willow.....	2.85	Black elder.....	25.5
Linden.....	3.27	Vetch.....	27.5
Elm.....	3.9	Poke.....	45.6
Maple.....	3.9	Wheat stalks, young.....	47.0

Wheat straw	4.18	Dried stems of potatoes	55.0
Flax	5.0	Wormwood	73.0
Rush	5.08	Furmitory	79.0
Common thistle	5.37	Angelica	96.2
Vine branches	5.5		

NOTE 5.—*Carbonate of Potash*.—"Carbonate of potassa (i. e. pure carbonate of potash,) is very soluble in water, dissolving in its own weight of that liquid. It is extremely deliquescent, and hence a portion of it exposed to the air for some time, attracts so much water as completely to dissolve it into an oily liquid called by the older chemists *oleum tartari per deliquium*.—(Bache, United States Dispensatory.)

NOTE 6.—*Mica in the San Joaquin*.—I have often been struck with the peculiar levity of mica scales, and their dancing qualities in water, which I attribute to their shape, by means of which they seem to have exactly the same specific gravity as it has; and in watching those shining swimmers, I have been surprised at the quantities of them in such rivers as the San Joaquin, by which they are carried buoyantly along, most of them doubtless to the ocean, but when the river is swollen, to be deposited to a great extent along the banks.

NOTE 7.—*Components of Clover and Potatoes*.—According to the analysis of Sprengel, as quoted by Professor Johnston, the ash of ten thousand parts of potatoes as dug from the field, and of one thousand parts of dry hay of clover, contains respectively as follows:

Saline Components.	In 10,000 parts Potatoes.		In 1,000 parts Dry Hay.	
	Roots.	Tops.	Red Clover.	Wh. Clover.
Potash	40.28	81.9	19.95	81.5
Soda	23.34	0.9	5.29	5.79
Lime	3.81	129.7	27.80	23.48
Magnesia	3.24	17.0	8.33	3.05
Alumina	0.50	0.4	0.14	1.90
Oxyd of iron	0.32	0.2	.....	0.63
Silica	0.84	49.4	3.60	14.73
Sulphuric acid	5.40	4.2	4.47	3.53
Phosphoric acid	4.01	19.7	6.57	5.05
Chlorine	1.60	5.0	3.62	2.11
Total	82.83	308.4	74.78	91.32

In forming conclusions between the relative alkaline properties of clover and potatoes, let us compare this table with that from the United States Dispensatory in Note 4. In this we find the potash in the potato tops, as dug from the ground, 81.9 in ten thousand parts;

showing that they must have contained a large proportion of water, as their dried stems by the other table are stated as containing in one thousand parts fifty-five parts of potash, which is considerably more than the proportion in the same quantity of dried hay of white clover. We must also keep in mind that according to the experiments of C. W. Johnson, seven thousand grains, or one pound, of the bread fruit potato, contained five thousand grains of water.

NOTE 8.—*Experiments with Lime and Salt.*—"It has been shown by the experiments of my brother," says C. W. Johnson, "that by mixing two parts of lime, and one of common salt, and suffering the mixture to remain in a shady place or covered with sods for two or three months, a gradual decomposition takes place, muriate of lime and soda are formed, and the whole mass speedily becomes incrustated with alkali. There is another advantage to be gained from the adoption of this process besides the formation of soda, namely, that the muriate of lime is one of the most deliquescent or moisture-absorbing substances with which we are acquainted, and in consequence, wherever it exists in a soil, the warmth of the sun has in summer less influence on it than it would otherwise have."

A mixture of lime and salt seems to have been found a valuable manure a long time ago. One Christopher Packe, who in 1688 published an English edition of a work of Glauber's, especially refers to it in his preface. "For the enriching of poor and barren lands," says he, "it is the cheapest of all mixtures, and is most easy to be done, for any plowman having once seen it done may be presently able to manage it." A Mr. Mitchell, of Ayr, (Scotland,) also mentions his success with such a mixture many years since; and the Rev. Edmund Cartwright, of Holland House, Kent, a zealous agriculturist, in experimenting upon potatoes with twenty-five different manures, found it superior to nineteen others.

NOTE 9.—*Ashes of Grain and other Plants.*—As I may have occasion to refer to the composition of the following cultivated plants at different times as I proceed, it may be as well to give the annexed table from Professor Johnston's work on agricultural chemistry, as quoted by him from the analysis of Sprengel. It shows the amount of their different components in one thousand parts of the plant:

Plants, {1,000 parts.}	Total Pounds.										
	Potash.	Soda.	Lime.	Magnesia.	Alumina.	Oxyd of Iron.	Oxyd of Manganese.	Sulphuric Acid.	Phosphoric Acid.	Chlorine.	Silica.
Grain, of Wheat.....	2.25	2.40	0.96	0.90	0.26	Trace.	.....	0.50	0.40	0.10	4.00
Straw, of Wheat.....	0.20	0.29	2.40	0.32	0.90	Trace.	.....	0.37	1.70	0.30	28.70
Barley Grain.....	2.78	2.90	1.06	1.80	0.25	Trace.	.....	0.59	2.10	0.19	11.82
Barley Straw.....	1.80	0.48	5.54	0.76	1.46	0.14	0.20	1.18	1.60	0.70	38.56
Rye Grain.....	5.32	in soda	1.22	0.44	0.24	0.42	0.34	0.23	0.46	0.09	1.64
Rye Straw.....	0.32	0.11	1.78	0.12	0.25	Trace.	.....	1.70	0.51	0.17	22.97
Oats, Grain.....	1.50	1.32	0.86	0.67	0.14	0.40	.....	0.35	0.70	0.10	19.76
Oats, Straw.....	8.70	0.20	1.52	0.22	0.06	0.02	0.02	0.79	0.12	0.05	45.88
Field Beans, Seed.....	4.15	8.16	1.65	1.68	0.34	.....	.....	0.89	2.92	0.41	1.26
Field Beans, Straw.....	16.56	0.50	6.24	2.9	0.10	0.07	0.05	0.34	2.26	0.80	2.20
Field Pea, Seed.....	8.10	7.39	0.58	1.36	0.20	0.10	.....	0.53	1.90	0.38	4.10
Field Pea, Straw.....	2.35	.....	27.30	3.42	0.60	0.20	0.07	3.37	2.40	0.04	9.96
Vetch Seed.....	8.97	6.22	1.60	1.42	0.22	0.09	0.05	0.50	1.40	0.43	2.00
Turnips, Roots.....	2.39	1.15	0.75	0.25	0.05	0.03	.....	1.22	0.36	0.24	0.39
Turnips, Leaves.....	3.23	2.22	6.20	0.59	0.03	0.17	.....	0.80	0.98	0.87	1.28
Carrots.....	3.53	0.92	0.66	0.38	0.04	0.03	.....	2.52	0.51	0.07	18.09
Parsnips.....	2.08	0.70	0.47	0.27	0.02	Trace.	.....	0.27	0.10	0.18	0.14
Vetch Straw.....	18.10	0.52	19.55	3.42	0.15	0.09	0.08	1.22	2.80	0.84	4.42
											51.01

NOTE 10.—*Treatment of Salt Marshes in England.*—In England it is usual not to attempt cultivation till white clover makes its appearance naturally, artificial means being seldom had recourse to for the purpose of freshening the soil, as experience shows that the after fertility of the soil is thereby diminished. This may be accounted for from the fact that sea water does not owe its saltiness to common salt alone. According to Sweitzer, the water of the English Channel is composed of water 964.744, chlorid of sodium 27.059, chlorid of potassium 0.765, chlorid of magnesium 3.667, bromide of magnesium 0.029, sulphate of magnesia, 2.296, sulphate of lime 1.407, carbonate of lime 0.033—total 1,000 grains. By allowing the soil to remain undisturbed till the excess of chlorid of sodium, which has a greater affinity for water than the salts of lime and magnesia, is washed out by natural means, these necessary ingredients of plants are retained without diminution, and the reclaimer of such lands is rewarded for his patience by their extra fertility.

NOTE 11.—*Different Degrees of Saltiness in Salt Marshes.*—It will at once be seen, that when land has been reclaimed from the sea, which at all times was covered by salt water, the mud is impregnated with little more salt than the proportion contained in salt water, whereas where marshes are only partially covered at high water, their mud contains a far greater proportion of salt, for the reasons previously stated; and must in consequence take a much longer time before they can be brought successfully into cultivation. Thus, while in some situations it sometimes takes a number of years before lands reclaimed from the sea are considered in a fit condition for cultivation—in October, 1855, when the writer of the patent-office report on the draining of Haarlem Lake, which I have already referred to, visited the scene of the operation, on the bottom of the former sea, and only a few years after the waters had been drained off, “numerous neat, quaint, and conveniently constructed cottages were seen in various directions; a population of about two thousand dwelt within the palder; fields of verdure extended far and wide, enlivened by cattle and sheep; and everything the eye could look upon indicated the triumphant achievement of great and beneficent design.”

In some instances such soils have been found almost immediately suitable for the growth of rough hay. “The best time,” says Mr. Lambson, of New Jersey, “to sow down in grass is when the tide is first shut off.” In reclaiming a salt marsh on the coast of Kerry, in Ireland, the land was found immediately available for the production of *agrostis maritima*, a coarse grass which grows on the sea side; (different varieties of *agrostis* growing, also, in other exposed and barren situations, where few grasses would thrive.) But it forms but inferior pasturage, and it is not in being able to produce a wild herbage of this sort that the reclamation of such lands can be said to be effected.

NOTE 12.—*Reasons for Departing from Common Practice.*—Although, as would appear from Note 10, there are good and valid reasons for not precipitating, in England, the cultivation of lands reclaimed

from the sea, when we reflect that our soils are naturally so abundant in the mineral constituents of plants, and that the barrenness of the alkaline soils is purely owing to their having them in excess, it will at once be seen that we have no occasion to be apprehensive of suffering from an undue acceleration of the desired object; and besides, *time* is of so much value with us, that even though we incurred some little risk, we would generally feel very much disposed to go ahead.

NOTE 13.—*Beets*.—From my own experience I can speak of the suitableness of beets as a first crop for saline lands—a property which they undoubtedly owe to the large quantity of alkaline matter which they contain.

NOTE 14.—*Lime, and Carbonate of Lime*.—Lime is valuable to the farmer for two reasons. In its caustic state it assists in the decomposition of organic and mineral substances in the soil; and as carbonate of lime, as a necessary constituent of plants. As it is in the former respect that we propose on this occasion to use it, we must be careful not to let it become saturated with carbonic acid, however useful it may be in that state, until it first accomplish the object for which it is more especially wanted. That it is a necessary constituent of plants, a glance at the table in Note 9 will convince any one. The universal experience of farmers confirms the other fact; and also, that to enable the young plants to be benefited fully by the gross matters in the soil which are thereby decomposed and rendered soluble, it is necessary that it be applied in the previous autumn, to allow time for that purpose.

NOTE 15.—*Mill Ponds*.—In Scotland, on almost every moderate sized farm, the farmers have suitable threshing machines, built up permanently in their barns. In the north of Scotland a great proportion of these machines are driven by water. As their principal grain crop is oats, the straw of which is almost as valuable, when newly separated from the grain, as ordinary hay, it is usual for them not to thresh out their grain any faster than they require the straw. Consequently a very small stream of water, when proper care is taken of it, is all that is wanted for their purpose. To obtain this water, they are often at considerable cost, and are careful not to waste it—collecting it in watertight ponds, where it remains until required. The mode of constructing embankments of well worked materials, which I have recommended, is such as they generally adopt in the construction of their mill ponds.

NOTE 16.—*Expensive Embankments*.—I would take my present note, also, from my experience and observations in Scotland. There the farmers invariably embank the straths or haughs, as they are called, along the banks of the rivers and mountain streams, one of which is found in almost every valley. This land being alluvial, is much more fertile than that of the slopes on the hill sides, which, in many places, is naturally poor enough. They are consequently every year getting more alive to the value of their low lands; and it is really surprising

what a number of expensive embankments we find in many places—the proprietors of the land generally defraying a considerable portion of the cost of their erection. But in no single instance, about which I have put myself to the trouble to make minute inquiries, have I failed in discovering that those who had made the greatest outlay in that respect, and thus made themselves perfectly secure, were deriving the greatest return on the amount of capital invested.

NOTE 17.—*Irrigation*.—Phillips found in the water of the Thames, *above* London, in every gallon about twenty grains of solid matter; and in the Calne, at the main spring in the valley which supplies it, twenty-two; and Dr. Dana, one of the greatest of modern mineralogists, estimates the quantities of salts in solution, and vegetable matter, which were borne seaward past Lowell, by the Merrimac River, in 1838, as reaching the enormous amount of eight hundred and forty thousand tons. Running water is, therefore, a liquid manure of nature's own providing.

NOTE 18.—*Essex Marshes*.—In irrigating water meadows for hay, for the purpose of turning the water to the greatest advantage, it is allowed to run over the surface at stated times, and for this purpose a regular system of veins and arteries are provided, one portion of the drains being used for supplying water, and another for carrying it off. The Essex marshes being used principally for pasturage, are managed in a simpler manner; water being admitted every few days from the river at full tide to supply that which has just been drawn off, to within eighteen or twenty inches of the surface, and into the same channels. This is the system of irrigation which we want, and the only one which is suitable where land is under cultivation.

NOTE 19.—*Fresh and Stagnant Water*.—Admitting that running water contains a number of foreign ingredients which have got dissolved in it, which are apt to get deposited as it passes along, and which stagnant water consequently cannot yield but in a very diminished quantity, we are naturally induced to suppose, as our soils contain already those ingredients in excess, that no such objection could apply to the use of stagnant water as might be urged in other cases. So far this is doubtless true, but when we recollect that as well as having saline ingredients, it is loaded with vegetable matters, and that after a time decomposition takes place, by means of which its components become changed in their character, we may have far greater evils to guard against than the mere deprivation of those foreign substances with which it has got impregnated. Some of the elements of spirits and oils, which are in daily table use and deservedly appreciated, on their being decomposed by combustion, are converted into carbonic acid gas, which is destructive of life.

NOTE 20.—*Sea Salt*.—Sea salt (chlorid of sodium) is not very soluble, requiring about three times its weight of water to dissolve it.

NOTE 21.—*Relationship of Saline Soils.*—Let a and b represent the alkaline and salt-water properties in tule lands. When they exist in equal proportions, the composition of those lands may be represented by $a+b$; which let us suppose to be only one-half of the saline matter in either of the others—the other half having been washed out, or being otherwise wanting. Now if tules possess the property of similar plants, and to a certain degree take the elements of the one salt or the other, indifferently, say to one-half of the quantity which they generally use, saline soils capable of growing tules may be composed of $a\frac{a+b}{2} = \frac{3a+b}{2}$ or of $b\frac{a+b}{2} = \frac{a+3b}{2}$. But we have supposed the tule lands to contain only one-half of the saline matter of either the alkaline or salt-water soils, consequently the relationship of the different soils under consideration would be in this ratio (hypothetically): mean tule soil $= a+b$; alkaline soil $= 3a+b$; salt-water soil $= a+3b$.

NOTE 22.—*Substitutive Properties of Plants.*—This is a fact in vegetable physiology so well known that any attempt to prove it by examples is unnecessary—no two analyses by the same chemist, of the same plants from different fields, being exactly alike. Though plants, as shown by the experiments of Saussure, possess the power to a certain extent of selecting those salts and earths to which they are more partial, to a certain extent they are merely mechanical absorbents, and are obliged to succumb to circumstances. True, their vegetative powers are said to enable them to reject, after absorption, those which are unsuitable. “The substances thus conveyed to plants,” says Liebig, “are retained in greater or less quantity, or are entirely separated when not suited for assimilation.” But to enable us to form a proper conception of how it happens that plants succeed in using different proportions of those ingredients, we have only to remember how their growth is produced. Though I have scarcely had occasion to advert except to the mineral constituents of plants, they are principally composed, as we all know, of a quite different material—carbon—which the plant has to get from the atmosphere. Now suppose, as in the case of the *salsola soda*, which in its natural situation has always been accustomed to get the alkali soda to discharge for it that necessary office—when, through caprice, it is planted in gardens, the soil of which abounds in potash, but where it has scarcely a particle of soda near it, as it cannot help absorbing potash, I see no reason why it should not discharge the task of collecting carbon for it, as it does for other plants. Experience proves that it does so. Again, almost if not all plants require silica with which more especially to strengthen their stems, taking a little lime and alumina along with it; but when *silex* is scarce, and lime and alumina plenty, they are content with less of the first, and instead take more of the others. To this accommodating principle in plants we evidently owe, in some measure, our power of acclimating them.

NOTE 23.—*Suitableness of Oats as a First Crop.*—On this point I would quote a sensible article from the “Michigan Farmer,” as reprinted

in the "California Farmer." "There are two objects to be kept in view in cultivating marsh land; first, the immediate growth of a profitable crop, and next, the steady improvement and amelioration of the land. The marsh when drained is not by any means fitted for the growth of crops of high value. It is still raw and very rough. As yet the surface is of a peaty consistence; it has not been mellowed by exposure. The lumps and hillocks and small tassocks have not yet been leveled, for a single plowing will not permit this to be done. If the design is to lay the marsh down to permanent meadow, it is all-important that the surface should be made as level as possible. To effect this with economy, we incline to that practice which makes a crop of oats first to be taken from marsh land. One thing is certain, that those who have been most successful in improving marsh land invariably have recourse to oats as the crop with which to subdue the sod at the least expense, and we find that this practice is also the most general in Scotch and English husbandry."

NOTE 24.—*Harrows and Harrowing*.—"Before Jove," says Virgil, "no husbandman tilled the ground; the earth of itself produced everything; now harrows break the sluggish clods, and the hinds pray to the gods for moist summers and serene winters." Those who use harrows for such purposes are right. They who consider them only wanted for covering the seed are mistaken. So convinced was the enthusiastic Tull, with whom commenced a new era in agriculture, of the importance of making a fine mold, in cultivation, that he believed he could by such means entirely dispense with manures. The germinating seed requires something more than merely to be covered; it wants a loose and mellow soil, in which it may spread out the little spongioles of its roots for nourishment without interruption, and find its earthy constituents finely comminuted in abundance. To effect such purposes, the harrow should be light and strong, and made to embrace as much of the ground as possible; and for the purpose of making it lie close, it is of importance to have it jointed. In a well plowed field the objects of harrowing are not obtained by weight, but by a repetition of light strokes. In our case, they have to be effected in a different way; for the plowed field is necessarily rough, and we require weight and strength. The harrow of which I have given a sort of general description, is such as I had made for myself expressly for a similar purpose, and which I found to be eminently efficient.

NOTE 25.—*Experiments of Knight*.—To ascertain how far plants were endowed with the power of avoiding poisons, Knight placed under their roots pieces of alum and green vitriol, (sulphate of iron,) but they did not seem to be at all affected by them until they came into actual contact.

NOTE 26.—*Analysis of Fruit Trees*.—Dr. Emmons, of Albany, found in one hundred parts of the earthy components of the pear, apple and grape, the following ingredients:

	Potash.	Lime.	Phosphate of Lime.
Pear.....	22.....	13.....	27
Bark of pear.....	6.....	30.....	6
Apple.....	16.....	19.....	17
Bark of apple.....	5.....	51.....	3
Grape	21.....	17.....	15
Bark of grape.....	2.....	39.....	5

The peach, from being a tree of rapid growth, necessarily requires abundance of alkaline matter in the soil, the want of which would bring on disease. The accomplished Downing was aware of this, and for the cure of "the yellows" recommended "shortening in, and a thorough renovation of the soil by alkaline applications."

NOTE 27.—*Analogical Reasoning.*—By the strict metaphysician, analogical reasoning is looked upon with distrust. It is the doctrine of similarities and resemblances, and does not include mathematical demonstration. Yet on no surer guidance do the great bulk of mankind daily place their dependence, in one-half of their opinions and adventures. If they were engaged in the investigation of the operations of nature, they would be less often deceived. So intelligible, simple, and uniform are the laws by which the Supreme Intelligence has seen fit to bind her, that it is scarcely possible for us to be misled, if we do not overlook special reasons for making special deviations necessary from the means generally resorted to in similar cases, for the accomplishment of similar objects.

NOTE 28.—*Experiments of Saussure.*—To test the selective powers of plants, Saussure dissolved various salts in the same solution, and made plants to vegetate in them, of which experiments the following table exhibits the results, supposing the original weight of each salt to have been one hundred, each solution containing one one-hundredth part of its weight of each salt:

	Parts.
1. { Sulphate of Soda.....	11.7
{ Muriate of Soda.....	22
2. { Sulphate of Soda.....	12
{ Muriate of Potash.....	17
3. { Nitrate of Lime.....	4.5
{ Muriate of Ammonia.....	16.5
4. { Acetate of Lime	31
{ Sulphate of Copper	34
5. { Nitrate of Lime.....	17
{ Sulphate of Copper.....	34
6. { Acetate of Lime	8
{ Muriate of Potash	17
7. { Sulphate of Soda	6
{ Muriate of Soda.....	16
{ Acetate of Lime.....	0

These experiments succeeded nearly equally with *polygonum persicaria*, *bidens cannabina*, *mentha piperia*, and Scotch fir. But when the roots were cut or removed, the plants absorbed all solutions indiscriminately.

NOTE 29.—*List of Bulbous and Tuberous rooted Flowers and Ornamental Shrubs.*—On the principle that “the man who makes two blades of grass grow where but one grew before, deserves better of his country than many who have attained a brighter name,” I may be excused for introducing an especial favorite of mine—Bridgeman—whose useful work has been of much service to many an humble countryman, who, in raising his kitchen vegetables with its assistance, never felt the want of other works which have appeared before the world with greater pretensions. His brief list of bulbous and tuberous rooted flowers in more general cultivation, I transcribe:

Amaryllis.	Jonquil.
Anemone and ranunculus.	Lachenalias.
Crocus, in numerous varieties.	Lilies.
Crown imperial.	Narcissus.
Colchicum.	Ornithogulum, or star of Bethlehem.
Cyclamen.	Oxalis.
Double dahlia.	Peony.
Gladiolus, or sword lily.	Tulip.
Hyacinth.	Tuberose.
Iris, or flower de lis.	Tiger flower.
Lxias.	

To this let me add the following list of ornamental and flowering shrubs, taken by him from the “New York Farmer:”

- Amorpha fru(c)tiosa*, indigo shrub.
- Amygdalus nana*, dwarf double-flowering almond.
- Arelia spinosa*, or angelica tree.
- Cytisus laburnum*, or golden chain.
- Calycanthus floridus*, allspice.
- Ceanothus americanus*, red root, or Jersey tea tree.
- Cercis siliquastrum*, or Judas tree.
- Colutea arborescens*, or bladder senna.
- Cratogeomys oxyacantha*, the hawthorn.
- Cyclonia japonica*, or Pyrus japonica.
- Daphne mezereum*.
- Dirca palustris*, or leather wood.
- Gymnocladus canadensis*, or Kentucky coffee tree.
- Halesia diptera* and *halesia tetraptera*.
- Hibiscus syriacus*, *f. pleno*, the double-flowering althea frutex.
- Hypericum frutescens*, shrubby hypericum.
- Kerria japonica*, or *corchorus japonica*, yellow Japan globe flower.
- Kotoneutaria paniculata*, Japan bladder tree, or kalvaterius.
- Ligustrum vulgare virens*, large European privet.
- Philadelphus coronarius*, or common syringa.
- Philadelphus inodorus* and *P. grandiflorus*, garland syringa.

Persica, or *amygdalus persica rosea pleno*, double-flowering peach.

Rhuscatinus, Venetian sumach, or Aaron's beard.

Ribes missouriensis, or Missouri currant.

Rabinia glutinosa, and *rabinia hispida*.

Rabinia pseudo-acacia, yellow locust tree.

Rosa, or roses.

Sorbus aucuparia, mountain ash, or roan tree.

Sorbus canadensis.

Spartium junceum, genista etc., broom.

Symphoria vacemasa, or snow berry, sometimes called St. Peter's wort.

Syringa vulgaris, or common lilac.

Syringa persica, or Persian lilac.

Tamarix gallica, or French tamarix.

Viburnum opulus, or guelder rose.

Vitex agnus castus, or chaste tree.

NOTE 30.—*Leaves of the Poplar*.—The fact that the poplar is a quick-growing tree is enough to convince any one that any soil, to be perfectly suitable for it, must contain mineral constituents in a state of solution in abundance. Of those constituents, Saussure found in one hundred parts of ashes of the leaves of the *populus nigra*, a well known variety, on the tenth of May, 1836, and on the twelfth of September, twenty-six parts of alkaline and other salts. In the ashes of the bark, the same chemist (or his son?) found sixty per cent. of carbonates; and in the ashes of the wood, twenty-seven per cent. of carbonates, and 16.75 of phosphates—the loss being nearly one-fourth of the whole.

NOTE 31.—*Components of Tobacco*.—The analysis of Professor Johnston gave, in one hundred parts of the ashes of the leaves of tobacco, the following mineral constituents:

Potash	0.07
Soda	45.90
Lime	13.09
Magnesia	3.49
Chlorid of sodium, (common salt,)	3.98
Chlorid of potassium	5.48
Phosphate of iron	1.49
Sulphate of lime, (gypsum,)	6.35
Silica	8.01

All these ingredients are found in every fertile soil. That all our valley lands abound in iron and sulphur, every one who keeps in mind the universal diffusion of black sand, and the immense onions which we raise in California, must be aware; for all the onion family are conspicuous for their richness in sulphur, (Lagrange.) Of the soils to which I more particularly refer, having lime and magnesia, we may not be so fully conscious. But let us reflect, in regard to the latter, that sea water contains a large proportion of chlorid of magnesium and sul-

phate of magnesia, (Note 10;) and that the tule lands, as they exist at the mouths of the creeks and rivers, on the bay of San Francisco, for instance, are gradually produced by the operation of causes which effect new combinations. The rivers and winter floods bring with them an alluvial soil, rich in carbonaceous matter from decayed vegetables, and in the mineral constituents of plants from the rocks, and among others a large proportion of carbonate of potash and sometimes of soda. When these are brought thither, the combining acids and bases of the former salts gradually make selections from among their new neighbors of other associates for which they have a greater affinity than for each other, chlorine connecting itself with soda in preference to magnesium, and the deserted magnesium forming a new alliance with carbonic acid, and in that state being precipitated as an earthy carbonate. Such soils, therefore, necessarily abound in magnesium.

They must also possess a certain amount of lime, for lime forms a mineral constituent, in greater or less proportions, of every land plant which grows, and the situation of those lands shows that they are yearly receiving foreign supplies of decaying vegetable matter. But we find in the ashes of tobacco a more than usual proportion of it. I would therefore recommend, in its cultivation, a liberal application of lime, it being the only auxiliary which such lands require to adapt them perfectly to the growth of tobacco.

NOTE 32.—*Liebig and the Farmers of Scotland.*—The learned world seemed taken by surprise by Liebig's production, such was the general acclamation with which it was received. Of all the learnedly great men, from all parts of christendom, who were members of the association, and who, at Glasgow, had met in convention, he was, as if by general consent, admitted to be the most learned and the greatest. He was the lion of the day. A sun among the stars, by whose greater effulgence, for a time, they were all eclipsed. His society was sought after, and his friendship courted by the highest in the land, and the services of learned professors to aid him in putting his manuscript in condition for the press, tendered and accepted; and some time afterward the king of Prussia, reflecting that his was no unjustly acquired celebrity, conferred upon him the dignity of a baron. But another, and in his estimation far greater honor, was paid him by the farmers of Scotland. The newspapers, which rung with his fame, also gave some account of his reasonings and revelations; and though he was only a few weeks in Scotland, during the time the association was in session, and in receiving the hospitalities of his friends, he had the satisfaction of seeing, with his own eyes, before he left it, the intelligent and active farmers of that country putting his lessons in practice.

ESSAY ON ALKALINE SOIL.

BY WILLIAM SIMPSON.

To study the cause of a disease is the first step toward finding a remedy. To discover the cause of sterility in a barren soil is an important advance toward its reclamation; and the same fascinating science which assists the physician upon the ascent of knowledge, also elevates and enlightens the farmer.

The quality and proportion of food necessary for a healthy existence, is determined by chemical investigation as well in the vegetable as in the animal kingdom, and a large number of the diseases of both can be traced to the elements of their nutrition. By continuing the analogy, we see that plants, like animals, exist only where their food is supplied by nature, and while the simplest reasoning explains the absence of animals in a country where their food is not seen, it requires a more studious investigation to account for the lack of herbage upon a desert.

The barrenness of a soil is owing to a want of proportion in its ingredients. Sand, clay, lime and potash, are the principal earthy and alkaline constituents of all fertile soil; an excess of potash and soda, the undoubted cause of many of our alkaline wastes, is a very unusual promoter of barrenness in the older countries. As it is, in a great degree, to the using up of this ingredient that soils are impoverished by cultivation, and as it is to this substance that animal manures, in a great measure, owe their fertilizing effects, we should rather look upon these alkaline excrecences upon a country over-rich in the elements of fertility as bearing an apt comparison to those eruptions upon the surface of the animal body which are indicative of an over-supply in the blood of the elements of nutrition. To the abundance of the salts of potash and soda everywhere in the soil of California, may be, in a great degree, ascribed the enormous yield of her cereals, the majestic size of her trees and the mammoth proportions of her vegetables.

The source of the alkalis has been correctly attributed to the decaying granitic rocks of the mountains, and the study of its accumulation is simple and interesting. An alkaline soil is, strictly speaking, a soil which contains an excess of alkaline ingredient, but as its earthy constituents are variable, the term is definite in nothing but its alkaline properties, and, although from the impervious nature of the clays, they are more liable to its accumulation, yet alkaline loams are by no means uncommon in the country.

The most striking characteristic of alkaline soil deduced by analysis, is the great excess of the salts of potash and soda, and the absence of undecomposed vegetable mold. One of the offices of this latter substance is evidently to hold a supply of potash among other matters, to be gradually given up to the demands of growing vegetation, and holding these matters bound up in its organic composition, they are only set free by its slow disorganization or decay. Then, knowing the property of potash and soda to decompose vegetable mold, when brought

in contact by solution, it is easily seen that the vegetable remains must set free their alkaline matters soon after the plants have ceased to live.

The greater part of the alluvium of our valleys was probably at first too highly alkaline for the growth of vegetation, until, by a succession of rains, the excess was washed out, and this process could only have taken place where there was an inclined surface, or a loose absorbent soil beneath. Upon such spots as gave the rain water no escape, the alkalies would remain fixed, and so in fact we find it. The most distinctive character of an alkaline clay is its flat, or basin-shaped surface, and the tendency that rain water has to *stand* upon it. The soluble matters are dissolved by every shower, and deposited by every drouth, while the surrounding higher soil, having had its alkalies washed away, has clothed itself with a rich vegetable mold, and those fertile hillocks so frequently seen upon alkaline barrens, which were (as any one can find by digging,) original prominences in the alluvium, are covered with luxuriant herbage, not because their soil differed, originally, from the surrounding waste, but because, from the position of their surface, the rains have carried away the excess of alkali.

The first plants taking their places upon an alkaline alluvium would be such as consumed the greatest proportion of alkaline salt, and while clothing the soil by their decay with a fertile dressing, they would be also shutting up in their organisation those ingredients whose presence, in excess, was obnoxious to a better kind of vegetation. The presence of potash in a soil is quite as necessary for the growth of healthy vegetation as any other of its constituents, and only on account of its great solubility in water is a small excess injurious; for lime, another alkaline substance, exists in even greater proportions without the slightest injury, and the binding up of the former alkali in the decaying vegetable fiber is a beautiful provision of nature, guarding against its total departure by drainage, and probably one of the chief uses of those innutritious, potash-consuming plants, is the agency they have in the process. As a proof, we have to recollect the large proportion of the salts of potash found in the ashes of vegetable mold.

One of the most striking, sensible qualities of alkaline soil that I have examined, is the extreme fineness of its earthy particles. To such a soil the presence of undecomposed vegetable mold is indispensable to its porosity. But when the tough residuum from the alkaline solution of that substance is mixed through the soil, it only agglutinates its earthy ingredients, and assists to give a quality of baking in the sun, which is in itself a serious obstacle to cultivation. The residuum spoken of can be seen, during the dry season, in tough, brown scales, upon the surface of any alkaline soil affording sufficient herbage for its supply.

When one of our mountain streams "all of whose waters are in a degree alkaline," overflows its banks and spreads upon the adjacent country, the effect of the inundation is easily surmised. Upon loose, absorbent soil, where the heavy stand of herbage would annually consume in its growth, and bind up in its decay, a large portion of alkaline salts, such overflows are enriching; but upon an impermeable clay, where the water can only leave by evaporation, a baneful accumulation of alkali is inevitable.

The soil cannot rid itself of its yearly supply of this fertilizing ingredient, which soon becomes excessive, and thus the identical deposition from the same stream would be on one hand forming, by a proper mixture of vegetable remains with its earthy and saline ingredients, the most valuable and productive soil, and on the other a barren, alkaline waste. In this way much of our alkaline soil is formed. The quantity of free salts of potash and soda which a soil may contain, without injury to vegetation, is about one per cent. of its weight, and but few of the cultivated crops can be made to thrive in a soil containing more than this proportion; and although many valuable plants afford large proportions of potash, by analysis, it must be recollected that this ingredient of the soil is more particularly the food of their ripening stage, and that these plants are no more capable of withstanding the scorching effects of potash and soda, in their early growth, than any other.

The general proposition of adapting "different kinds of fruit, grain, trees, etc., to this kind of soil," owing to the variable nature of its earthy ingredients, appears to me impracticable. Its close texture, the absence of undecomposed vegetable mold, its tendency to bake in the sun, the position of its surface, or want of drainage, are as great obstacles to overcome as the superabundance of potash and soda in the soil. In presenting this analysis, I have thought best to give a brief synopsis of the manipulation, which can be followed by any one wishing to prove the result. Four hundred grains of soil was taken from an alkaline spot, sustaining a scanty, poor herbage, first heated up to browning paper, and weighed. Loss, water of absorption. Boiled with about eight ounces of distilled water, filtered, washed and dried. Loss, soluble matter. Sand separated by decantation, dried and weighed; sand treated with muriatic acid, and weight of calcareous sand estimated by diminution.

The remaining portion of the soil was then mixed with muriatic acid, and its carbonate of lime estimated as before. Both muriatic solutions were then mixed, and the iron precipitated by prussiate of potash. The remaining matter was burnt strongly in a crucible, and the loss, after allowing for the water of the clay, was estimated as insoluble vegetable matter. Only the slightest trace was found, hardly sufficient to blacken the mass. The vegetable matter, more properly, humic acid, was precipitated from the first solution by muriatic acid, dried and weighed. Another portion of the same weight of soil was boiled with distilled water, and the soluble salts collected by evaporation. The following is the result:

Specific gravity.....	2.016.
	Grains.
Water of absorption.....	15
Very fine silicious sand.....	203
Calcareous sand.....	14
Clay.....	122
Oxyd of iron.....	7
Carbonate of lime.....	9

Soluble matters, consisting of carbonate and sulphate of potash and soda.....	11
Humic acid with alkaline bases.....	5
Loss.....	14

It is quite likely that the sulphate of lime and a salt of phosphoric acid and magnesia may be present in this soil, but as these substances are rather difficult to detect, and as my object was principally to find the nature and proportion of the alkali, no attempt was made to discover them. As has before been stated, much of our alkaline soil has been formed by the evaporation of water left by the inundation of our mountain streams, but the soil under examination is the type of that extensive class of barrens situated far out upon the plains, entirely away from river inundations, the alkaline nature of which can be clearly accounted for by the disintegration of the clay and mica which they contain. When these latter substances are mixed with lime, and subjected for a time to the influence of air and moisture, precisely the same alkaline salts are set free that we have found in the soil. It is certainly not strange that in just such natural combination in the soil, the same result should follow. In fact, this process is continually going on in all fertile lands, and it is only when these alkalies are not consumed by plants nor carried away by drainage, that they become excessive. The alkaline nature of this class of barrens is the result of other conditions of the soil, which are obnoxious to the growth of vegetation, and I am fully satisfied that in every such locality that I have seen, were the alkalies reduced to a fertile proportion, the soil would yet be incapable, without the assistance of art, of affording a profitable vegetation.

It must then be obvious how mistaken is any system of reclamation, which is directed alone to the using up, or the neutralization of the alkalies, and how clearly a loosening of the soil and the establishment of drainage is required, to produce the desired fertility.

ESSAY ON THE BEST MODE OF DESTROYING GOPHERS AND SQUIRRELS.

BY JOHN STRENTZEL, A. M.

The serious injury which cultivators of the soil sustain by the depredations of gophers and squirrels, is to such an alarming extent incurred in California, that a certain and safe mode of destroying those animals is of the utmost importance.

Considering the habits of the gopher—of cutting, if possible, through every obstacle opposing their subterranean passage; also that they relish for food the bark of all our fruit trees, this little animal is certainly the most annoying of the two, and often the cause of irreparable injury to the horticulturist.

My grounds being considerably infested with gophers, and finding it difficult to dislodge them, induced me to observe carefully their habits, and accordingly to adopt means for their destruction.

The favorite food of the gopher is onions, parsnips, carrots and beets; and once established in a plot of the same, he appears to be satisfied with his lot, as he will discard other food, offered him as 'niceties to entrap him, and seldom will show himself above ground. On this account the rainy season, and the time before the crops are planted (as scarcity of food makes them more eager to take whatever may be offered as a bait, and the ground being soft facilitates their burrowing in search of food; at this season they are also in the habit of leaving their passages open, at certain times of the day, apparently for an airing,) is the best time for their successful extermination.

I have tried different ways of destroying them, and have found a dose of strychnine, or of shot, and the hereby submitted trap as the only efficacious ways and means to obtain the desired end. Before proceeding to discuss the respective merits of my arcana, I have briefly to state that the popular notion that the castor oil plant (*ricinus off.*) is a bane to gophers, will not agree with my experience, nor of my neighbors. The lately proposed plan of smoking them out with an ingeniously prepared brimstone and resin compound, is theoretically plausible, and would be efficacious if applied in our boxed up frame houses, but offers, in practice, some unmistakable objections; one is the opposition of the animal, whose peculiar habit is of shutting up with earth all ingress to his domain, whenever assailed; the other, still more formidable, is the quick absorption and neutralization of the evolved fumes by the moist soil.

For poisoning I have tried sugar of lead, (*acetes plumbi*), as less obnoxious to the taste, but without effect, as they would chew at the bait but spit it out. The potency of strychnine, in destroying animal life, cannot be gainsayed, but their unperverted taste and instinct are not easily gulled. They are very nice about their food. In dissecting the stomachs of gophers entrapped, I have noticed the contents perfectly clean from all soiling with earth or any adhering husk—very often I have found the poisoned bait nibbled at and rejected; at other times, when the bait was taken, the animal would be missing only for a few days from each respective burrow—sometimes I thought they were killed. For a bait I have used the tender stalk of cabbage, an onion, parsnip, carrot or beet root. I choose a small plant, handle with clean hands, and do not touch, if possible, the end I insert—split the root longitudinally half through, and dust in the fissure one-half or three-fourths of a grain of strychnine, and drop it in a freshly opened passage.

The effects of a well directed shot are the evidence of things seen. I have killed a great many, and in a small garden they can be readily, by this means, kept under. The best time for shooting is the early morning, within one hour after sunrise, during the spring and early part of summer. At this season the gopher is in the habit of opening the burrow and leaving it open, throwing out dirt and coming out and nibbling at contingent vegetation. The gunner may take his

position fifteen to twenty feet distant from the open hole, on the side free from the thrown out dirt, (otherwise the mound will cover the animal,) remain unmoving, either standing or squatted, and wait for the appearance of the animal. The gopher is very quick of motion, and remarkably so when throwing out dirt—wait patiently until the animal comes out and exposes at least half of his body, and remains quiet, apparently taking observations of surrounding objects—this is the opportune time to fire, to successfully bag the game; once escaped, it will be difficult to find him napping again. As long as the ground continues mellow, the gopher will open the hole several times during the day, more frequently during the forenoon, but invariably at sunset, offering frequent opportunities for a shot.

The objection to gunning is the loss of time required to watch for the appearance of the animal, which requires often one hour, and even longer; also, he may close up the passage without coming out. This he is sure to do if scared off by approaching steps, or the unguarded motions of the gunner.

The most preferable and economical way of destroying them, I have found by means of the trap I hereby submit. This trap is set by inserting the plate at the notched ends, between the arms, about three to four inches from the end, as marked on the same. I have caught many without any bait, but it is better to insert a piece of onion or any of his favorite roots, in the aperture of the plate, as otherwise they will often close up the passage without coming within reach of the trap—enlarge the opening of the hole with a knife sufficiently to admit the trap three or four inches within the passage, set it in, either with the embracing arm directly upward or downward, as your convenience may dictate, and cover over the whole with a few leaves, grass, or whatever is handy; this latter precaution is not indispensable, still it insures success. The trap may be inspected every few hours, and if the passage is closed up, which frequently happens, it must be reopened and the trap newly set. In setting the trap in a fresh hole opened by the gopher, I find it necessary to walk up cautiously and insert the trap by digging or enlarging the hole as little as possible, using the precaution to draw out any soil which may have crumbled in by the operation. I have always found but one animal to occupy a burrow, and if he is caught, the trap must be set in another fresh worked place.

The modes of destroying squirrels are similar to those employed to encompass the same end by gophers; only poisoning has more objections and is dangerous; they often will die above ground and so offer a chance of destruction to valuable dogs, cats or swine. The use of phosphorus obviates this danger, but may subject a community to great loss by fire, which its use may originate, as has been already experienced. Squirrels offer a greater facility to successful trapping than gophers; they possess less of sagacity to elude the snare, only it requires several traps to be set at once, to cover all the holes of egress which one animal may possess. A very good and convenient bait is made by stringing a few acorns and tying them up to the ensnaring plate; a piece of bread, or an ear of wheat or corn will answer the same purpose. The

use which they afford as animal food amply repays the expense of the traps and the time used in setting them. As their burrows are amply large to draw after them the trap, this can be prevented by tying cross-wise a short stick to the trap.

What I claim as preference for my trap, is the facility and cheapness of its construction, which can be manufactured by any blacksmith. Also, the small size of the trap offers facilities for setting it in the burrows of squirrels, gophers, or any other small animal, requiring but little digging or enlarging of the passage; this, in hard and dry ground, offers a great convenience, which any person experimenting with different traps will be soon aware of.

Lastly, the animal not having to touch any part of the trap ("which might arouse his suspicion,") before reaching the bait, is with greater ease ensnared.

ESSAY ON THE SQUIRREL.

BY L. R. CHALMERS.

Believing that the object of the Society's invitation for essays upon the squirrel was simply to elicit the best method which experience would suggest for their certain and speedy destruction in those portions of the country so ruinously infested by them, I shall avoid any further description of their habits than such as may be necessary to illustrate the *rationale* of the successful method which I have adopted for their *certain, speedy*, and I may say *economical* destruction, especially in the hope, that should your committee deem the plan suggested of any material moment, it will meet with a more rapid acceptance, and more speedily become of practical benefit from the prestige of the Society's forthcoming reports.

To be brief, I will commence with a few facts of observation in regard to the habits of the squirrel, and the conditions under which it exists during the period of time embraced in the system of operations hereafter to be mentioned.

First.—The squirrel of this country usually makes its habitation beneath the surface of the earth, at such depths only as are sufficient for its protection against other animals, which prey upon it, and the obtainment of a certain regularity of temperature to free it from the vicissitudes of climate.

Secondly.—Depths below a certain point of equalization of temperature are only excavated to that point of moisture necessary to retard perspiratory elimination. Hence it is, that we do not, or very seldom, indeed, find the squirrel commencing new holes upon the surface during the warm dry months, but if it digs at all, it simply lowers the depth of its old habitation to the point of temperature and moisture required by its animal economy. That point, seldom in the low lands and never on the high uplands, extends to the surface of the water, as many sup-

pose, for we find this animal pushing its remarkable industry upon elevations of many hundred feet above the water's level, and in sections of country where there is no liquid moisture upon the surface for miles, within its reach, and yet the animal lives permanently in its habitation, rears its young, and flourishes. How far liquid moisture may be absolutely necessary to their continued vitality, we are unprepared to say, nor do we deny its actual presence in the neighborhood of all localities inhabited by the squirrel. Whence then is it obtained? I answer, in all cases, on uplands where there is not water upon the surface, or within a very few feet of it, the necessary liquids are obtained from the juices of the shrubbery, of grasses, of late perennial plants, and from the tender bark of trees. We will, then, in the plan hereafter proposed, cut off these sources of moisture, so necessary to their existence under all circumstances, and rendered doubly so in the critical situation in which the destructive method will place them.

Thirdly.—Owing to the many peculiar ingredients which compose most of the soils on this coast, they become, during their exposure to the hot sun and the unvaried aridity of our climate during the summer months, intensely indurated, which is one main cause that prevents, and renders the excavations from the surface by the squirrel, in most cases, impossible. In many silicious soils, however, this extreme induration does not take place; but these exceptions are confined to the low, sandy bottoms of the rivers, usually subjected to annual overflows, and so near the water's level that they are saturated with moisture by constant evaporation. It is not upon these lands, however, that the squirrel is of much serious inconvenience, as they are annually drowned or driven off by the overflows. This induration of all the upland soils, however, so serious an obstacle as to prevent entirely all new excavations from the surface, during the dry months, shows a condition to be sought after in our remedial plans, of considerable importance. We shall, therefore, in the destructive method hereafter proposed, increase the nature of this serious obstacle, and by that overwhelming accumulation of difficulties with which we shall surround it, hope to accomplish their easy and speedy extermination in a most economical manner.

Fourthly.—Every variety of soil, except on the low bottoms of the rivers near, and in the mountains, possessing mean elevations inconsistent with its formation, or rather deposition, contains to a greater or less degree the vegetable, mineral and volatile alkalies, rendering the dry excavations of the squirrel during the hot summer months, disagreeable, seriously affecting the visual organs, producing spasmodic action of the glottis, and, under long continuance, suffocation. We shall, in the method of extermination proposed, bring this anti-vital condition of the soils into full play, as one more auxiliary to the overwhelming total of calamities which shall exterminate our foe.

Fifthly.—During the months of July, August, September and October, the squirrel, by instinct, is busily engaged in hunting and storing up food for the winter season; consequently the amount of labor aside from this, which the squirrel performs, is extremely limited, and only the result of extreme necessity. Hence again, it is, that the summer exca-

variations are exclusively confined to lowering the depth of their old habitations for moisture and equalization of temperature, and hence it is, if during these months the natural instincts of the animal are thwarted, and it is placed under such conditions as to suffer for moisture in its liquid state, and for food even for a few days, its chances for life are extremely limited and precarious. Those who pet them in cages, well know that a little neglect in their daily supply of food and water during the warm season, is usually fatal.

Sixthly.—Squirrels inhabiting trees invariably select the rotten trunks or larger limbs, an inward access to which has been made by the industrious woodpecker; consequently these entrances are, with the assistance of a ladder, of easy access, and within range of the exterminating system proposed.

Seventhly.—The squirrel is migratory in its habits only to an extent required to fulfill its instinctive necessities for food or water. Hence, in many portions of the country where these conditions are easily fulfilled, their numbers increase with amazing rapidity, and their roads and highways are seen traversing the plains in every direction, but invariably extending from one hole to another, at such distances apart as is found convenient for a rapid ingress if suddenly surprised or pursued when they venture out for food. Hence it is that all the various methods hitherto tried to poison or shoot them, seem comparatively unsuccessful, because their places are soon re-supplied with new occupants from the surrounding country. It will be a prominent feature in the simple method proposed, to stop this immigration entirely, and which will result from the very nature of the operation. To a farmer who is seriously injured by their constant depredations upon his crops, and who is engaged in any process of their extermination, it not only is important but exceedingly gratifying to be able to know and set accurate bounds to his certain progress. This we propose to do.

It is no less important, in the present cramped condition of the farmer's finances, that some method should be devised that will prove effectual, upon a more economical scale than that of poisoning or even of shooting them. This economy both as to time and money, together with a certainty and limit of progress, besides the stoppage of immigration, we propose to attain by one simple method within the reach of all, rich or poor.

We are now acquainted with all the habits of the squirrel, and the important physical conditions which surround it, to perceive at once the philosophy upon which the method proposed is suggested, and I can give no clearer idea of that method than by relating in detail my successful plans for their extermination by incarceration for life. The period to commence operations is any time after the month of June, until the fall of the first heavy rains in the fall of the year, when the ground is indurated, the atmosphere dry and hot, the grasses and herbage deadened.

In the first place, I take my small wagon, load it with sound, dry wood, that may be easily worked up into pieces of two or three feet in length, take my ax and a maul or iron sledge, and visit every hole, driving a

plug into each one, soundly, with the sledge. Should there be any small crevices, I also thoroughly stop them up, and finish the operation by scraping over the hole all the loose dirt that lies around it. After plugging, in this manner, every hole, both old and new, within a convenient limit, I leave some extra billets of wood for future use, should occasion require, and drive on to the next section of ground contiguous, and go through the same process again, and so on until the day's work is finished.

On the following morning I again take my team and implements and first revisit the previous day's work in order to replug those holes which may have been dug out, and to see if I passed over any, without plugging, the day before. This being accomplished, I then go on to new ground, taking care to keep always upon some arbitrary division of the field, until it is entirely visited, to avoid mistake in visiting new grounds from day to day. I continue in this manner until I go over the whole field. There is nothing then to do but to go over the ground every morning, with an ax upon your shoulder, and restop those few holes that may be opened the night previously, and also plug some that may have been overlooked. This simple process is followed up regularly from day to day, for two or three weeks, until the entire number of squirrels is worked, starved, and suffocated to death.

After the grounds are thus thoroughly gone over, I then take a twelve foot ladder and plug all the holes that I can get at conveniently in the trees. Once plugging is here sufficient.

I had frequently tried plugging a few holes for several years past, and in almost every instance where the plugs were sound, of sufficient length and size, and well driven in, they have remained until this day, and there are no evidences of the squirrels which I saw run into the holes previously, having ever again seen day-light.

Having suffered severely from their depredations upon my crops, I have been from time to time experimenting with various poisons, which I invariably found quite uncertain, expensive and tedious. Trapping and shooting are alike objectionable, and had not my attention been drawn accidentally to some old plugs that were put in thoroughly some two years since, I should the following year be alike subjected to their destructiveness. This summer, on forty acres of land, I plugged, thoroughly, about three hundred holes. It occupied one hand three days to go over the ground the first time, and about two hours per day for two weeks afterward in revisiting and replugging. Of the three hundred holes thus stopped, only about fifty were ever reopened, and these holes were mostly of such peculiar construction that it was impracticable to stop them as they should have been, the first time. A single squirrel or a fresh hole is not now to be seen on the grounds, although they are surrounded by hundreds, and will probably immigrate more or less during the winter season, when the ground is soft and easily excavated, unless my neighbors speedily adopt the same plan.

The cost of clearing one hundred and sixty acres to the farmer is the hire of one hand about two weeks, to devote his exclusive attention to this method of plugging and keeping the holes plugged for that length of

time—twenty dollars; board, ten dollars: total, thirty dollars. In most cases, however, it is best that the proprietor does the work himself, and then he knows when it is thoroughly done, and is at no outlay of cash at all.

This is the simple method which, after many fruitless experiments for the last six years, made by myself as well as by my neighbors, I have found to be most certain, expeditious and economical; for it works, starves and suffocates, and also prevents immigration from adjoining grounds.

It is well here to remark, that the great secret of success is in doing the work thoroughly and being prompt in following up the daily revisits for, at least, two or three weeks. The old adage, "To do well that which is worth doing at all," is here peculiarly appropriate, and must not be forgotten.

We deem it unnecessary to recapitulate the peculiar habits of the squirrel, or to go further into details of its natural history; nor is it important to impress upon the recollection the peculiar physical conditions which surround the animal during the months of July, August, September and October, the period of time contemplated in the simple method above stated. A slight reflection upon these topics, in connection with the thorough and continued imprisonment of the animal from two to three feet beneath the surface of the sun-baked, almost rocky ground, of these months, we think will establish all the conditions necessary for the certain, rapid and economical extermination of this little animal, so destructive to the labors and expectations of the farmer. At least, we are both theoretically and experimentally satisfied, and have no further fears of having our crops harvested prematurely by the squirrel.

ESSAY ON WINE MAKING.

BY S. W. HALSEE.

The vocation of agriculture originated with the creation of man, and has been followed through successive ages, and by many nations, until the present day. It is not, therefore, in embryo, but a calling as old as the earth itself. The knowledge and experience of so many years should be carefully collected and disseminated through all agricultural countries, in order to stimulate investigation, and to develop their resources. By these means, capital and the physical and intellectual energies of the people are called forth. There is no plant cultivated, more delicate and sensitive than the shapeless and rough-looking grape vine. The fruit has animated the poet's pen and the skill of the painter's brush, while Solomon himself was led captive and "taken in" by imbibing its juice. The use of its alcohol was expressly forbidden.

The cultivation of the vine requires skill and care in order to pro-

duce the finest quality of fruit. The character of the vine itself is entirely changed by the climate, the mode of cultivation, and the composition of the soil. In Europe, even on the same plains, or on the same side of a mountain slope, these variations exist. In the same district two contiguous vineyards will produce dissimilar wines. The same is true of the vineyards in Los Angeles. The soil is alluvial, formed from the action of the river on the adjoining hills, and varies from fine black clay to white coarse sand and pebbles. In these locations there is no vineyard of eight thousand vines which produces the same quality of wine. The flavor of the wine and quality of the soil are identical.

Knowledge, experience, and systematic operation are absolutely necessary for the successful cultivation of a vineyard; and in the manufacture of wine, chemical knowledge, science and skill are of the utmost importance, as the "process of fermentation" does not obey the usual laws of chemical action. Authorities differ, hence we have several theories in regard to the fermentative process.

By some it is deemed a vito-chemical action; by others the vital combination is rejected, and it is viewed as a strictly chemical action.

The following is the correct philosophy of wine making: The ingredients of grape juice, which undergo a change during fermentation, are the organic compounds of sugar, fibrin, gluten, albumen, gum, and cellular tissue. The vito-chemical action destroys about two-thirds of these ingredients, which escape as carbonic acid, or fall to the bottom, as lees, or extinct animalcule, while the sugar and cellular tissue are converted into alcohol and fusil oil. This oil is more closely allied to alcohol than to any other organic substance. (See Liebig's Agricultural Chemistry, pp. 104-5.) It is observed that a greater quantity of alcohol is obtained when the mash is made quite neutral by means of ashes or carbonate of lime, and the proportion of oil in the brandy is also increased.

The philosophy of fermentation is of little importance, so long as we can accomplish the purpose of making good wine, and retain undecomposed a due proportion of the matchless, unrivaled grape juice. But when we discover small proportions of fusil oil are introduced into our stomachs along with wine and brandy, it becomes an object of the highest importance. Fusil oil is an acrid, fiery, irritable and inflammatory substance, inflaming and diseasing the stomach and the brain, and reverses the exhilarating and agreeable effects of good wine and brandy.

In Europe, when wine and brandy contain this fusil oil, they are stored away for six or eight years, when the fatty or oily matter precipitates or falls to the bottom. There is certainly a remedy which, if employed, will remove this fusil oil—this dangerous ingredient—from wines and brandies.

The combined investigation of the whole community will soon remedy the evil.

The old fashioned process of making Monongahela whisky would only produce two gallons per bushel, which contained very little fusil oil. In the modern process lime is added, which produces one-third more alcohol, and increases the fusil oil in a still greater ratio.

So whisky drinkers have still more reason to complain than the wine bibbers. Indeed, alcohol is frightful enough without its ally, fusil oil. They are both enemies to the vital force. The stomach cannot digest them nor decompose them. They can only be expelled by expiration through the lungs.

In regard to wine making, we have, in California, every variety of soil, and the most favorable climate in the world to ripen and mature the fruit. One acre about Los Angeles will produce as many pounds of superior fruit as three acres will in Europe. On an average the soil here is too rich, as all experience proves that a loose and sandy soil is the best.

The quality of the fruit corresponds to the distance between the buds on the vines. The shorter the distance the more valuable the fruit for wine making.

The locality should be protected from the cold winds, and the soil free from alkali and excessive moisture.

That California is destined to be a great wine-producing country, and many fortunes made and lost in manufacturing it, is the belief of an old wine grower.

I forward by A. Ferguson, Esq., a keg of wine made from this year's grape, to which I would call your especial attention.

1st. There is no fusil oil in it, and it is proven from the fact that it will give no pain in the head.

2d. It has the exact flavor of the grape, without the flat or peculiar taste of the Los Angeles wines.

3d. Give it six months age, and it will be taken for a different class of wine, of superior quality.

4th. I have been nine months experimenting on wine and brandy, at a cost of six hundred and ninety-eight dollars, and have exceeded my most sanguine expectations in preserving the flavor of the grape, and in precipitating the ingredients which deteriorate the wine.

5th. This is the first experiment, and I have greatly improved on the first specimen, but the samples are too new to forward.

The merit I claim is its purity, and a fac-simile of the grape flavor. On these two points depends the price of all wines.

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ERRATA.

- Page 4—A new Article in the Constitution, to be numbered V, read as follows: "The Office of this Society shall be permanently located at the city of Sacramento, and the Corresponding Secretary shall be a resident of that city."
- " 5—In second line of second paragraph, for "became" read "began."
- " 5—In fifth line of second paragraph, for "by" read "from."
- " 9 to 64, inclusive, in running title, for "fair" read "report."
- " 130—For "competition essays" read "premium essays."

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